



HAN UNIVERSITY OF APPLIED SCIENCES

Degree Statute and Education and Examination Regulations of the Masters degree course Molecular Life Sciences 22-23

School of Applied Biosciences and Chemistry
Academic year 2022-2023

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PART 1 General part

Adoption

This degree statute was adopted by the dean on 08-07-2022, after consent was received from the degree committee on 16-5-2022 and consent from school council on 06-07-2022.

1 About the degree statute

The Higher Education and Research Act stipulates in article 7.59 that an institution such as HAN University of Applied Sciences (hereafter HAN) is obliged to adopt and publish a student charter. The Student Charter consists of two parts: the institution-specific part (which we call the 'Student Charter') and the degree-specific part (which we call the 'Degree Statute').

The degree statute consists of three parts:

- Part 1: General part.
- Part 2: The Education and Examination Regulations, which outline the education, final assessment, exams and modular exams for your degree course.
- Part 3: Other regulations.

Part 1 is purely informative. No rights can be derived from it. Rights and obligations can be derived from the other parts; these are legally applicable regulations.

1.1 Which degree course(s) does this degree statute apply to?

This is the Degree Statute for the following HAN degree course(s) composed of units of study:

Degree course	Degree format	CROHO number	Degree after graduation
M Molecular Life Sciences		49293	Master of Science

This degree statute contains information on the structure, organisation and execution of the degree course, the student facilities, counselling and study coaching, the education and examination regulations and the other degree-specific regulations that describe student rights and responsibilities. When this document subsequently refers to 'the degree course', we mean the above degree course(s).

1.2 How do you read this degree statute?

We use regular UK spelling rules.

When we use 'you', we mainly mean you as an internal or external student enrolled in this degree course at HAN. But we also mean others, such as prospective students.

1.3 How long is the degree statute valid for?

A new degree statute is written for each HAN degree course every academic year. The degree statute for a certain academic year applies to everyone enrolled in the degree course for that academic year. It does not matter which phase of your degree course you are in, whether you are an internal or external student, or when you started. You can find the digital version of the degree statute

here: <https://hanuniversity.com/en/programs/master/molecular-life-sciences/fulltime/practical-info/#student-services-and-support>.

This degree statute applies to the 2022-2023 academic year: from 1 September 2022 to 31 August 2023. For students starting their degree course on 1 February 2023, two different degree statutes apply consecutively during their first 'year': the current one and that of the next academic year.

Did you enrol in the degree course in a previous academic year? And is the degree course working with a renewed curriculum or modifications in the education and examination regulations? You can read how this is organised in

Part 2, chapter 8 (Transition Regulations).

1.4 How does the degree statute come about?

The degree statute for the degree course is adopted by the dean each year. It is based on the model degree statute: a model that applies for the entire HAN.

The school council exercises the participation rights on the degree statute, but only in so far as the HAN participation council has not already exercised these rights through the model degree statute and in so far as these rights have not been conferred to the degree committee. How this works exactly is set out in the Participation Council Regulations and the Regulations of the Degree Committee.

Advice is requested in advance from the degree course's board of examiners.

The relevant HAN organisational bodies strive to publish the new degree statute each year before 1 July.

1.5 Consistency of degree statute, student charter and enrolment regulations

The Degree Statute is part of the Student Charter. The Student Charter applies to the entire HAN. The Student Charter lists all the rights and obligations of students and HAN.

The Student Charter can be found here:

<https://hanuniversity.com/en/study-and-living/studying-at-han/rights-and-responsibiliti/index.xml>

You can find the rules for application, admission, educational requirements, selection and enrolment in the Enrolment regulations. The degree statute only contains a number of specific additions to this. These additions may not contradict the rules from the enrolment regulations.

The enrolment regulations can be found at: www.han.nl .

2 Education at HAN

Your degree course is part of the HAN educational offerings. HAN has an overarching mission and vision on higher education. Your degree course embodies this vision in its own way. HAN's mission and vision are described in the HAN Institutional Plan. You can find this plan on www.han.nl.

3 Information about your degree course

3.1 Mission and vision of your degree course

The professional field of our master programme is the bioscience sector. This sector branches into pharmaceuticals and biotechnological companies, molecular research and diagnostic departments at (academic) hospitals, and university research groups who are active in applied or translational research and product development. This HAN Master in Molecular Life Sciences is a Professional Master that is specialised in applied/translational research and product development in the bioscience sector. The programme is strongly focussed on combining the laboratory and technical skills students previously acquired with competences required for managing projects within the bioscience sector. Therefore, the focus and characteristics of a Professional Master graduate will be different in comparison to the academic Master graduate.

The Master in Molecular Life Sciences graduate has a profound knowledge of biochemistry and of molecular and cell biology of prokaryotic and several eukaryotic organisms, thereby being specialised to perform Bioscience-related projects. Moreover, being trained in project management, interdisciplinary thinking and communication, in combination with an entrepreneurial focus (such as patent searches and business development), the HAN Master in Molecular Life Sciences is prepared for a role in applied research and product development phase in industry, or in applied/translational research in research institutions of the bioscience sector.

Social and organisational context

The HAN Master in Molecular Life Sciences graduates is prepared for working in different stages of the business pipeline that the bioscience industry uses for product development. As such the HAN Master Molecular Life Sciences programme takes in a unique position in the master programmes offered in the Netherlands. It serves the industry need for interdisciplinary, goal- and market-oriented professionals specialised in applied research and product development of both biotechnology companies as well as research institutions active in applied/translational research.

The Master Molecular Life Sciences graduate can be employed at:

1. Companies active in biotechnology, in fields such as pharmacy, personal health care, diagnostics, plant sciences, food- and feed industry etc. These can be small and medium enterprises as well as multinationals.
2. Research institutions such as universities, hospitals or governmental/private (contract) research institutes.

Examples are:

1. MSD, MSD Animal Health, DSM, DuPont, Byondis, Batavia Biosciences, Qiagen, European Veterinary Laboratory, QM Diagnostics.
2. TNO, RIMLS, NKI, Universities and (University) Hospitals.

Key features

A key feature of the programme is the strong link between the profession or practice and the degree course. This emerges clearly from the requirements set for students' practical experience and the close relationship between the education, professional field and organisations or businesses at which the student is employed. We strive for a high-quality connection between practice-based research and education.

Our basic standard for all this is the human scale, which means: small-scale, clear and with directly accessible lecturers and coordinators.

3.2 Content of your degree course

This section gives a broad description of your degree course. You can find the rules and details in Part 2, the education and examination regulations, and in the regulations in Part 3.

3.2.1 Scope

The scope of the degree course is represented in credits and study load. One credit is equal to 28 hours of study (this is an average indication). This is also stipulated as such in the Higher Education and Research Act. Your master course has a study load of 120 credits.

In the part-time and work-study degree format, these are grouped in 7 modules

3.2.2 Degree content



3.3 Organisation of your degree course

Management and organisation at degree course level

The programme is designed and organised by a core team. The core team is responsible for continuity, content, cohesion and coordination of the education. The team is supported in this by the secretarial office, which is located in room 0.07 of the Institute of Applied Sciences (on Mondays) and can be reached via 024-3530586 on all other work days.

The core team of the Master's degree programme is composed of the following members:

Andrea Thiele (PhD), coordinator

Remko Bosch (PhD), responsible for curriculum

Marloes Vissers (PhD), member of the examination committee

Organisation at School level

MMLS belongs to the School of Applied Biosciences and Chemistry. The director (a.i.) of the School of Applied Biosciences and Chemistry is H. Neidig. The SABC management reports to the directors of HAN (see also Chapter 6, HAN organisation, of this document).

3.4 How we educate and supervise

Good higher professional education is attuned to the developments in society and the professional environment. We are in close communication with potential employers to monitor what they demand and desire in a graduate. With that goal in mind we offer a programme with a very distinctive and unique character attuned to market demands to prepare best for the job market.

We are convinced that learning in the professional context is most effective. Therefore, we value the central role of professional practice in our education and we have made learning through practicing professional tasks the key principle of our curriculum. Professional tasks are meaningful tasks, as complex as those that are performed in the 'real' working environment. Students will work on projects in their entirety, not on parts thereof to practise a professional task in full. In our curriculum, this is realised in two ways: firstly, by learning in professional practice (workplace learning) and secondly by learning on project cases. Learning in professional practice implies that

student work on projects within the product development pipeline in bioscience in practice and in this, develop from project member to being responsible for a project.

The 'projects cases' that we have selected represent different product development pipelines present within different areas of the bioscience industry. In our programme, projects are defined as course units and all assignments within a particular course unit represent professional tasks belonging to one project. This means that multiple competences will be addressed in each course unit. We aim to acquiring the necessary set of competences with accompanying knowledge that are immediately and sustainably profitable for both students and their respective employers. Our defined set of competences, supported by a number of criteria (indicators), are the scaffold of our programme and the student's activities are always reviewed using the indicators as reference. The competence training is placed in the context of our so-called Body of Knowledge and Skills (BoKS). Both the competences and the BoKS are regularly reviewed and verified by representatives of the professional practice. We provide lectures, workshops, trainings, current literature and feedback by experts to support students in realising assignments (representing professional products) to complete a task (see figure 2). In doing so we ensure proper development of skills and attitude with accompanying Body of knowledge for all students. This way of active learning in the professional context enables students to apply their competences and knowledge in other situations and projects at their work place.



Figure 2. Schematic presentation of the case-based education of the Master in Molecular Life Sciences education programme. Assignments related to the professional practice are central in the learning process and supported by lectures, workshops, trainings, the literature and feedback by experts.

In the final module (major project), all competences are integrally applied and all individual indicators are reviewed and must be assessed sufficient. This is done through an integral assessment in which a project proposal, the project work, the master thesis, and the presentation and discussion are evaluated by a group of examiners. As such, a graduate will demonstrate that he/she has required all the competence indicators that belong to our professional master in molecular life sciences.

International orientation

An undeniable feature of the bioscience sector is the many collaborations across borders and the international composition of staff. In accordance, the Master MLS is entirely offered in English and students are from various countries. The curriculum structure represents the professional practise, and therefore the degree programme intrinsically applies international standards and competences.

3.5 Internships and/or workplace

Full-time students spend 3 days a week working as an intern in a laboratory at either a company or institute during the first three semesters of the programme. The other 2 days are used for attending lectures and other study activities. Semester 4 is dedicated for the graduation project during which students spend 5 days a week as an intern.

3.6 How the professional field is involved

Professional advisory committee

In monitoring the quality of the programme, HAN attaches great importance to the opinions of experts from the professional field in question. These experts meet at least once a year in the meetings of the professional advisory

committee.

The professional advisory committee consists of the following members:

- Henny Hofstede PhD (Pharmaceutical Consultant & Toxicologist), PSDD, Nijmegen
- Willemijn Hobo PhD (Assistant Professor, Department Laboratory Medicine), Radboudumc Nijmegen
- Nienke Vriezen PhD (Head Upstream Biotechnology), Byondis
- Martijn van Hal MSc (Director Operations), MSD
- Mark van Geffen PhD (Enzyre)
- Rik op den Camp PhD (Keygene)
- David Agorku (Miltenyi Biotec)
- Jan-Paul Favier PhD (Director) CLS Services

External supervisor

External supervisors are appointed to monitor and assess the quality of the final assessment.

Assessing the quality of the final assessment concerns in particular:

- the quality of examinations and assessment
- the quality of students (realisation of intended exit qualifications)
- the quality of the organisation of the final assessment.

The external supervisor is: Drs. Paul Smeets

External Advisor

The External advisors are chosen from companies or institutes of the biosciences sector. The External Advisor has an advising role for the assessment of the candidates for the Master's degree. The External Advisor has the following tasks:

- Judges the final report and presentation based on the assessment criteria.
- Formulate questions based on the Graduation Project Portfolio and presentation.
- Advises about the final assessment.
- Gives feedback on the final assessment with respect to content and process.

3.7 Research groups and research centres

Research groups relevant to the programme

The research groups Biodiscovery and Drug Discovery are involved in the Degree Programme.

The research groups are active in research and development in biotechnology and Drug discovery. Expertise are bioinformatics, molecular biology, (bio-)chemistry, (bio)analytical chemistry, fermentation technology and downstream processing. Current projects focus on efficient protein production using micro-organisms, on microbial oil production, development of tools for biorefineries, on the identification of new antimicrobial compounds, The contract research organisation HAN BioCentre is part of the research group Biodiscovery.

Staff of the research centre is structurally involved in the master degree course and the module Production of Biomolecules is directly related to research activities of the research group Biodiscovery.

The Research group Drug Discovery started in 2020 and focuses on improving processes necessary for the development of new medicines, such as the discovery of new targets for diseases (biological targets). They develop validated test systems with increased translation possibilities to humans (reduce animal testing), such as using C.

elegans as a screening system for various compound activities (e.g. toxicity). In addition, the research group focusses on the discovery of green molecules that interact with these biological targets.

The professor of the research group Drug Discovery is involved in the module Drug Discovery and Development of the degree course.

Further, some students of the masters course can combine the study with an internship at HAN research groups. They apply the knowledge and skills acquired in the master degree course in their internship as research member/technicians, and *vice versa*, the master course helps them to fulfil their role in the dynamic research environment in applied research for industrial clients.

3.8 Quality assurance of the degree course

The aim of quality assurance within the Masters degree programme is to work continuously on improving and guaranteeing quality. Quality assurance is carried out according to the parameters drawn up by the HAN University of Applied Sciences and elaborated for the Masters programmes in the “*HANdboek Kwaliteitszorg Onderwijs*”, 2011, update 2015 (HANdbook of Quality Assurance in Education).

Different stakeholders, which are students, professional field (professional advisory committee, the HAN Research group Biodiscovery and diverse other contacts), lecturers and alumni are involved in the quality assurance cycle. They are formally asked about their opinion about various quality aspects of the programme on a regular base, and are stimulated to give informal feedback. Evaluation scores are compared to targets. Possible causes for scores lower than targets are discussed, and improvement actions are initiated, carried out, communicated and evaluated. By continually going through Deming's Plan-Do-Check-Act cycle (PDCA cycle), the programme aims for continuous improvement of the quality of the programme.

In addition, the external supervisor has the task to give feedback on the realization of the final qualifications, their assessment and teaching supporting students in acquiring these.

The quality assurance system of the Master Molecular Life Sciences is described in the annual “Kwaliteitszorgrapportage” of the programme.

4 Exit qualifications and professional requirements

4.1 The professional field

The professional field of our master programme is the bioscience sector. This sector branches into pharmaceuticals and biotechnological companies, molecular research and diagnostic departments at (academic) hospitals, and university research groups who are active in applied or translational research and product development.

Aim of the programme

The aim of our programme is to educate masters that are able to plan and control a project(*) in applied research and/or product development in the bioscience sector.

(*) Projects can also be parts of projects and have a length of at least 3 months.

Professional tasks:

To meet this aim, we have discerned three professional tasks for our Professional Master in Molecular Life Sciences:

1. to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology;
2. to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs;
3. to implement such solutions in a successful and efficient way by organizing their realisation in projects, considering the interdisciplinary dimension and communicating with different experts. Such projects have a duration of at least three months.

The professional master is responsible for the realisation of projects in applied research and product development. In this role, our professional master is of added value for organisations in the bioscience sector (companies, hospitals or the R&D institutions) as he/she supports senior project leaders by creating a short and effective link between company policies and hands-on projects operational at bench level. The Master in Molecular Life Sciences graduates can take position in the interphase between research/innovation and standardised processes (such as production, analysis and diagnostics). Such functions can be for instance scientific QC support or technical operations support. The function name of our masters varies within companies. Examples are Senior Researcher, Junior Scientist, Assistant Project Leader, Associate Project Leader or Junior Project Leader. Some graduates have decided to continue his/her career with a PhD project in applied or translational research or product development.

4.2 Professional requirements

Not applicable

4.3 Exit qualifications

Competences

To apply and translate knowledge for the realisation of innovation and implementation of projects in the bioscience sector, the Master in Molecular Life Sciences needs to have specified competences.

These core competences are defined in dialogue with representatives of the professional practice. The six competences are:

- Professional conduct and professional development.
- Designing strategies for applied research and product development
- Design, analysis and control of experiments
- Communication
- Managing Projects
- Advising

These competence indicators, together with the Body of Knowledge and Skills, form the final qualifications of the Master in Molecular Life Sciences.

The following section gives a more general description of the competences of the Professional Master in Molecular Life Sciences, and is compared with the Professional Bachelor graduates in the area of Life Sciences, and with the academic Master equivalent (see figure 3).



Figure 3. Schematic presentation of the competence profile of the Master in Molecular Life Sciences (a Professional Master) in comparison to the Professional Bachelor and the Academic Master in the field of life sciences. The characteristic Competences of the Master in Molecular Life Sciences are Designing Strategies for applied research and product development and Managing Projects.

The comparison of figure 3 shows that the two competences 'designing strategies for applied research and product development' and 'managing projects' are prominent competences for the Professional Master in Molecular Life Sciences. This is in sharp contrast to the Academic Master programme in which designing (fundamental) research based on theory, curiosity and new ideas is key. Below follows an evaluation of the competences of our programmes and compares them with competences of the equivalent academic masters and bachelor graduates.

1.

Graduates of all three type of programmes need to be professional in terms of being pro-active, team-oriented personalities who reflect on their own actions, deal with feedback and are open to learning. Both master graduates are expected to learn autonomously. While the academic master is mostly a theory-driven curious personality however, the professional master shows an entrepreneurial attitude. As the professional master functions at the interphase between different expertise, establishing a coherent network belongs to his/her professional conduct as well. In addition, we expect that masters are able to reflect on the quality of their projects, their own role in projects, and on their own professional personality.

2. Our Professional Master designs strategies for applied research and product development in a product-, goal- and market-oriented way. He/she understands practical, economic, social and/or ecological needs. He/she is aware of the information obtained by fundamental research, but also of other factors such as costs, competitors or the patent situation and uses this information to achieve the company aims.
3. The competence design, analysis and control of experiments is important for all programmes of figure 3. Professional experience will increase after graduation at bachelor level but master employees are expected to conduct design, analysis and control of experiments at a higher level of quality, complexity and independency compared to bachelor trained employees.
4. Communication is another competence necessary for both bachelor and master graduates. However, whereas bachelors communicate predominantly over their experiments within research groups, masters are expected to have professional written and oral communication skills enabling them to communicate beyond their own group. Moreover, while for academic master, communication occurs mostly with peers through publications and presentations, communication of the professional masters often occurs in an interdisciplinary context. Communication with experts of different fields such as biology, statistics, patents specialists, legal affairs or finance departments is important for the efficient realisation of entrepreneurial projects.

5. Managing Projects in terms of project aims, deliverables, value, risks, responsibility, communication time and costs is typical for the professional master. It is a minor competence of the bachelor graduate and of the Academic Master graduate.
6. In line with competence 4, the professional master mainly informs and advises about aims, multidisciplinary interest, project approaches and results to people within and outside their own department. In contrast, the academic master is able to provide argument-based advice about research projects to others. The Bachelor, in contrast, advises about lab equipment or experimental techniques within the research group.

The professional tasks defined for our MMLS programme versus the needed competences:

Competences Professional tasks	Professional conduct and guiding professional development	Designing strategies for applied research and product	Design, analysis and control of experiments	Communication	Managing projects	Advising
to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology	x	x		x	x	x
to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs		x	x		x	x
to implement such solutions in a successful and efficient way by organizing their realization in projects, considering the interdisciplinary dimension and communicating with different experts. Such projects have a duration of at least three months.	x	x		x	x	x

Body of Knowledge and Skills of the Master in Molecular Life Sciences

Upon graduation, the student

Molecular biology (techniques)

- has knowledge and insight of genes, chromosomes, plasmids mutations/ SNPs
- Has knowledge and understanding of the principle of all standard techniques to detect DNA (such as Southern Blot, PCR, FISH, (next generation) sequencing), RNA (such as Northern blot, (q) RT-PCR, expression array, RNAseq, in situ hybridization) and proteins (such as SDS-PAGE, Western blot, immunocytochemistry, immunohistochemistry, protein array, mass spec) and to detect the interaction between biomolecules (e.g. immune-precipitation, chromatin-immunoprecipitation) and can apply the appropriate technique to answer a question about the presence, quantity, alteration/modification, or localization or interaction of DNA, RNA or protein"
- understands how gene expression is regulated in prokaryotes and eukaryotes and applies this knowledge to heterologous gene expression
- is able to design a strategy for gene cloning and heterologous expression
- understands the mechanisms of gene silencing by siRNA and is able to apply siRNA to downregulate gene expression
- is able to design a (conditional) knock-out strategy (e.g. by Crispr-Cas)

Cell biology (techniques)

- has knowledge and insight of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and localization
- understands the principle of techniques to analyze cell proliferation, cell cycle, apoptosis, protein modification and can apply these techniques to answer question on such cellular functions
- has knowledge and insight of the molecular mechanisms that contribute to cancer development and can apply this knowledge for the design of cancer diagnostics and anti-cancer drugs

Biochemistry (techniques)

- has knowledge and understanding of the physico-chemical properties of proteins, nucleic acids (DNA, RNA), sugars, lipids, endotoxin, salt, viruses and bacteria
- has knowledge and understanding of biomolecule purification methods (such as size exclusion chromatography, ion exchange, hydrophobic interaction, ultrafiltration, affinity chromatography, precipitation, filtration, drying) and is able to choose a purification method depending on the composition of the original sample and the biomolecule to be purified
- has knowledge and understanding about methods to analyse biomolecules (such as NMR, chromatography, enzyme assays, ultrafiltration, absorption measurement, selective breakdown, enzyme immune-assay) and is able to choose an analytical method based on the biomolecule(s) to be analyzed
- has knowledge and insight of metabolic pathways, cell chemistry and biosynthesis and can apply this knowledge to optimize metabolite production (metabolic engineering)

Enzyme production

- knows the industrial applications of enzymes

Vaccine discovery

- has knowledge and understanding of the immune response to pathogens (action of innate and adaptive immune system, induction and effects of cellular and humoral immunity, mechanisms for induction of memory)
- understand the mechanisms by which micro-organisms can cause disease
- knows different types of vaccines (such as attenuated, inactivated, subunit, recombinant, DNA), their mode of action and their advantages and disadvantages
- is able to choose a vaccine antigen, adjuvant and administration route depending on the immune response that is required and on practical aspect
- knows different vaccine production platforms, their advantages and disadvantages
- is able to design experiments to test the potency of a vaccine

Development of diagnostic tests

- knows different types of diagnostic tests, their principle of action and their advantages and disadvantages
- is able to define the importance of sensitivity, specificity, and other performance characteristics based on the desired application of the diagnostic test
- has insights in the principles, advantages and disadvantages of different diagnostic tests, e.g. serology and molecular diagnostics
- is able to choose a type of diagnostic test based on the required specificity, sensitivity, precision and practical aspects such as duration, requirement for staff training

Drugs Discovery, Development and Delivery

- understands the principles of pharmacology, pharmacokinetics & drug-biotransformation, and pharmacodynamics
- knows and understands drug design principles
- knows and understands the principle of different types of drugs and treatment approaches (small molecules, antibodies, gene therapy, chemotherapy, radiotherapy, immunotherapy), their advantages and disadvantages.
- Understand the procedures and principles involved in the preparation and structural analyses of unknown substances using UV, IR, MS, and NMR.
- is able to choose one type of drug as an active pharmaceutical ingredient depending on the desired biological effect
- is able to choose a delivery system based on desired selectivity and bio-availability
- is able to design a strategy to measure the bio-availability of the drug
- is able to choose appropriate in vitro and in vivo assays to test the efficacy and the toxicology of a drug
- knows with animal models can be used to test drugs, and the advantages and disadvantages of these models
- knows the different phases of clinical studies and what is required to enter the clinical phase of drug development
- knows that structure-analysis can be used to predict the function of the biomolecule and to discover interaction partners/ drugs

Quality assurance and quality control

- is able to define quality requirement for products and processes based on regulatory guidelines
- is able to describe a target product profile and critical quality attributes
- is able to design a strategy to validate a diagnostic test

- is aware of the requirements for entering the clinical phase, and for market entry
- is able to design a strategy to validate a diagnostic test
- is able to determine the sensitivity, specificity and precision of a diagnostic test

Process development and optimization

- knows the advantages and disadvantages of different production strains and is able to choose a suitable production strain for the production of specific proteins
- is able to identify critical parameters in the process
- tests critical parameters in the production process (USP and DSP) and interprets the outcome
- is aware of the fact that scaling up or down requires process re-optimization

Biobased economy

- Is able to explain the main principles of a biobased economy and its new technological challenges
- Is able to explain the difference between first, second and third generation feedstocks
- Is able to describe the steps needed to convert plant biomass into fermentation feedstock
- Is able to describe the technological challenges by using biomass as fermentation feedstocks

Statistics and experimental design

- understands the meaning of: statistical hypotheses, type of variable (continuous / categorical), association versus causation, confounding variables, variation, normal distribution, population versus sample, dependent and independent observations, Type I and Type II error, descriptive statistics, the relationship between central tendency (mean, median) and variance, p-value and statistical significance, log-transformation, one- or two-sided tests, multiple testing problems and its solutions
- is able to translate the research question into an appropriate statistical question, experimental setup and corresponding statistical analysis
- has awareness of power and sample size calculations
- understands the basics of design of experiments (DOE)
- methodology, including: design of experiments, randomization, blocking by nuisance factor, factorial design, screening design, comparative designs, optimization design, one-factor at a time
- is able to design and analyze a screening and / or process optimization experiment using experimental design
- is able to choose the appropriate statistical method for data Analysis, including t-test, ANOVA, multiple regression, chi square tests
- is able to determine the precision, sensitivity and specificity of a diagnostic test; and to understand ROC curves
- is able to report the results with tables and graphics

Bioinformatics

Data Mining

- The student is familiar with biological databases Databases (such as Uniprot, Genbank, PDBe, PFAM, PROSITE, CDD, PubMed, KEGG.EBI, EMBL, NCBI)
- The student is able to formulate a data strategy to answer a biological question.
- Sequence annotation (DNA and protein sequences)
- Is able to use the principles of transcription, mRNA processing, translation, post-translational modifications

and protein structure/domains to evaluate sequence annotation.

- Is able to perform BLAST-searches and analyse the results in a correct way.
- Sequence alignment, score matrices and phylogeny
- Knows the features of a qualitatively good alignment.
- Is able to illustrate the use of (multiple) sequence alignments.
- Is able to evaluate the evolution of sequences
- High-throughput data analysis
- understands the principle steps in analyzing high-throughput data obtained by –omics approaches.
- has analyzed and interpreted a limited number of high-throughput data and is able to communicate to specialists about such analyses

Intellectual properties

- is aware of the rights derived from intellectual properties and understands which implications these have for the production of generics and biosimilars
- is able to use patent databases to identify patent blocks
- is aware that he/she needs to contact patent experts if he/she is not sure how to interpret patent databases

Bio-business

- understands the meaning of the terms business models and business development, business value and financing
- is able to translate his/her projects plans in a concise business plan

Interpersonal skills

- is aware of his own cognitive style and recognizes the styles of team members
- has insight in different factors that contribute to an effective communication process
- knows the principles of situational leadership
- knows how to deal with possible conflicts
- is aware of intercultural differences

This section describes your exit qualifications at the end of the degree course. These exit qualifications are formally set in the education and examination regulations.

When you graduate, you conform to the exit qualifications of the degree course. In other words, you have certain (required) knowledge, understanding, skills and (if relevant) attitude, for the profession you have been educated for. The exit qualifications for your degree course are outlined below.

Nr.	Exit qualification	Description
1	Professional conduct and guiding professional development	<p>1.1. Shows a professional, pro-active, curious, scientific and entrepreneurial attitude: adapts quickly, motivates him/herself, shows initiative, is goal-oriented, and acts honestly and efficiently 1.2. Works efficiently in a team (colleagues, project leader, client) during all phases of the project through open communication and by considering the needs of others. 1.3. Pro-activity contributes to setting up and maintaining a professional network. 1.4. Critically reflects on the project with respect to scientific project management approach and results. 1.5. Critically reflect on the own role in the course of a project. 1.6. Critically reflects on the own personality and how this influences professional conduct. 1.7. Defines personal learning goals (based on project/work requirements) and guides personal development to reach learning goals.</p>
2	Designing strategies for applied research and product development	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues 2.2. Combines information from different sources in the context of the own project 2.3. Defines the project aim in terms of products and/or results based on the acquired background information 2.4. Defines the quality requirements for products and processes based on legal requirements. 2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel 2.6. Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects) 2.7. Identifies opportunities to patent products, results and strategies.</p>
3	Design, analysis and control of experiments	<p>3.1. Designs experiments based on the required quality and quantity of the product or result. 3.2. Applies strict logical thinking to draw conclusions from the results and interprets them: - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements. 3.3. Solves practical problems if experiments do not work as planned (trouble shooting); couples back to the theory or consults colleagues if necessary; suggests alternative experiments.</p>
4	Communication	<p>4.1. Reports project plans and results according to the standard format of scientific documents and meets the scientific international conventions criteria 4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium 4.3. Describes the key message of the project relevant for patenting, registration, and/or business development. Uses terminology that is understandable for experts from different departments 4.4. Organises and moderates meetings 4.5. Contributes to the efficiency of meetings by being prepared and actively participating 4.6. Keeps client and project members informed about project progress at all stages, especially when the project is not progressing as planned 4.7. Shows initiative to adapt communication styles to the others and the situation at hand.</p>

Nr.	Exit qualification	Description
5	Managing projects	Takes responsibility for a project by: 5.1. Defines project deliverables based on the needed quality and quantity 5.2. Identifies project risks based on the (experimental) approach and on (putative) competitors 5.3. Defines project exclusions 5.4. Organizes the project in phases and defines decision points/ milestones 5.5. Describes the project organisation including the responsibilities of all project members 5.6. Writes a communication plan concerning all project members and parties involved 5.7. Describes a schedule based on the (experimental) plan 5.8. Describes the required budget 5.9. Performs his/her responsibilities 5.10. Approaches others if they do not perform to their responsibilities 5.11. Sets priorities and works efficiently towards the defined project aim/deliverables 5.12. Is in control of the project during all phases by being pro-active if the project does not run according to the plans and initiating an alternative strategy 5.13. Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy 5.14. Obtains the deliverables in time and with the described resources; if not, reasons and justifies the decisions that have been taken in the course of the project.
6	Advising	6.1. Actively involves different specialist to collect advise contributing to the progress of the project. 6.2. Actively participates in a discussion about related projects by asking critical questions and suggesting follow-up experiments. 6.3. Advises about follow-up projects of the own project. 6.4. Integrates own project results in the multidisciplinary defined goals and advises other departments 6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources

The level of the exit qualifications is geared to the Dublin Descriptors.

As a result, our degree courses are guaranteed to be at the correct national and international level. The degree certificates meet all legal requirements and are therefore comparable with and equal to similar degree certificates from other universities of applied sciences in the Netherlands and abroad.

Relation between the EQF descriptors and the competences matrix

	<i>Professional conduct and guiding professional development</i>	<i>Designing strategies for applied research and product development</i>	<i>Design, analysis and control of experiments</i>	<i>Communication</i>	<i>Managing projects</i>	<i>Advising</i>
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- have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Bachelor's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context;		x	x			x
- can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study;		x	x		x	x
- have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements;	x	x	x		x	x
- can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously;				x		x
- have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.	x					

Relation between the competences and examinations (modules in bold):

	Professional conduct and guiding professional development	Designing strategies for applied research and product development	Design, analysis and control of experiments	Communication	Managing projects	Advising
Fundamentals						
Exam			x			
Drug Discovery and Development						
High-throughput analysis		x	x	x		
Drug Discovery poster presentation		x	x	x		x
Fundamentals of Pharmaceutical Chemistry		x	x	x		
Structure Elucidation Analysis			x			
Production of Biomolecules, part 1						
Strategy for microbial oil production (presentation)		x	x	x		x
Production of Biomolecules, part 2						
Planning and quotation for small scale protein production		x	x	x	x	
Vaccines and Diagnostics						
Vaccine proposal		x	x	x	x	x
Validation plan for analytical validation of diagnostic test		x	x	x	x	x
Research and Product Development, part 1						
Scientific document		x	x	x		

R&D presentation				x		
Research performance 1		x	x		x	x
Design of Experiments		x	x	x		
Scientific Progress report			x	x		
Research and Product Development, part 2						
Research performance 2		x	x		x	x
Assignment on Quality regulations		x		x		
Business plan		x		x	x	x
Project management, part 1						
Professional conduct including network analysis	x			x	x	
Project proposal		x	x	x	x	
Project management, part 2						
Professional effectiveness	x			x	x	
Reflection on realization of proposal and own contribution	x				x	
Graduation project						
Project Proposal		x	x		x	
Report		x	x	x		x
Project Reflection	x	x		x	x	x
Workplace Activities	x	x	x	x	x	x

For an explanation of the NLQF levels see: <https://www.nlqf.nl/nlqf-niveaus>.

5 Academic calendar

This chapter outlines the lecture days, lecture times and the holidays and lecture-free weeks.

5.1 Lecture days and lecture times

Regular tuition day of the programme is Monday. Not every Monday is scheduled as contact day. In addition, a complete week of lectures and course activities are scheduled in November of the first year.

The dates of the course-specific holidays, contact days and deadlines for assignments are provided as a preliminary year schedule at the beginning of the course.

The definitive dates, including lecture times and exact deadlines for assignments are provided at least two weeks prior to each module in the detailed module schedule.

In addition to the contact days at HAN, full-time students spend 3 (first 1.5 years of the study programme) to 5 (final 0.5 year of programme) days a week at their internship placement to complete their workplace learning modules. The exact days and times are set in agreement with the placement supervisor.

5.2 Holidays and lecture-free weeks

The calendar for this academic year can be found on HAN Insite. It gives the lecture weeks and holidays.

The lecture weeks and holidays indicated in the calendar for this academic year on HAN insite can deviate from the lecture weeks and holidays of this degree course. Please consult the year schedule of the degree programme as indicated in chapter 5.1 of this document.

6 HAN organisation

This chapter gives information about the organisation of HAN. Here you also find information on participation, quality assurance and the facilities you as a student can use.

6.1 Schools

At HAN, the degree courses are divided over 14 schools.

Your degree course belongs to School of Applied Biosciences and Chemistry..

6.2 Management and organisation of the school

On HAN Insite you can find information about the set-up, organisation and staff of your degree course, and about the school they belong to.

6.2.1 Board of examiners and examiners

The members of the board of examiners can be found

on: https://www1.han.nl/insite/hlo/english/content/International_Office.xml?inno_gen=gen_id_410&sitedir=/insite/hlo/english

You can contact the board of examiners for your degree course via the board of examiners secretarial office examencommissie.atbc@han.nl

The members of the board of examiners are appointed by the HAN Executive Board.

The tasks and responsibilities of our board of examiners can be found in the Regulations of the Board of Examiners. These include additional rules regarding final assessment and examination in so far as these are within the powers of the board of examiners. See also the Regulations of the Board of Examiners in Part 3 of this degree statute.

The board of examiners decides, amongst other things, whether you meet the conditions set out in the education and examination regulations.

The board of examiners appoints examiners for each exam and modular exams. One or more appointed examiners administers that exam or modular exam and determines the result.

Other duties and powers of the board of examiners include:

- Assuring exam quality.
- Granting exemptions.
- Handling requests for an extra opportunity for an exam or a modular exam.
- Handling requests for modified exam or modular exam formats.
- Handling complaints.

You can find all the further rules on exams, modular exams and the final assessment that apply to you in the education and examination regulations (see Part 2). For rules on how these are organised, please refer to the Exam Regulations (see Part 3).

6.2.2 Participation and consultation

Below is a short overview of the HAN committees and councils. They discuss and also influence the policies and decisions made at HAN.

Degree committee

There is a degree committee for each degree course or group of courses. A degree committee consists of an equal number of staff members and students. The degree committee advises the course department about promoting and guaranteeing the quality of the course department. Each year it also evaluates the degree course's compliance with the education and examination regulations. The degree committee also has a right of consent and advisory rights. Through this committee, you can contribute ideas and make decisions about the education and organisation of your degree course.

Would you like to become a member of the degree committee? You can request more information from Opleidingscommissie-MMLS.ATBC@han.nl. The degree committee has its own regulations (see Part 3).

School council

Each school has its own school council. This council has the right to discuss all matters concerning the school and to ask the dean about these matters. The council also has the right to be consulted on school policies. The school council gives you the opportunity to contribute ideas and decide on school policies.

Would you like to know more about the school council? Contact the school council secretarial office: academieraad.atbc@han.nl

Participation council

The participation council allows staff and students to participate at HAN level. This council has a right of consent on certain aspects of policy, on the main features of the institution budget, the general applicable part of the education and examination regulations and more. The participation council has an equal number of students and staff. The participation council deals with general HAN policy.

Would you like to join the participation council? You can ask for more information from the secretarial office for the participation council: secretariaat.mr@han.nl. Would you like to learn more about the participation council? Go to <https://www.han.nl/over-de-han/organisatie/bestuur/medezeggenschap/index.xml>.

6.3 Student facilities

As a student, you can rely on good coaching and guidance during your academic career. Within your degree course, you and your study coach look at what coaching you need, your study progress and your career development. We look at your talents, ambitions and support needs.

In addition to the coaching offered within your degree course, you can use the services offered by HAN Study Success. This is a team of experts who work together on one goal: your growth as a student.

On www.han.nl, under the 'Studying' tab, you will find all information about the facilities that are offered in- and out-of-school. The right of students to the various facilities is regulated in section 3.1 of the Student Charter. The various contact details are included in chapter 5 of that statute. The Student Charter can be found at:

<https://hanuniversity.com/en/study-and-living/studying-at-han/rights-and-responsibiliti/index.xml>

The main facilities are briefly summarized below. For more information about these facilities, see www.hanuniversity.com or www.han.nl.

SUPPORT

HAN Study Success

All HAN students can contact HAN Study Success for support, advice, training and coaching. This is a network of experts in various areas of student supervision. They have expertise in:

- Study skills, language skills and personal development.

- Degree transfers and study delays.
- Psychological support.
- Student finance, support funds and support and questions about finances.
- Studying with special circumstances, chronic illness or pregnancy.
- Course selection and further studies.
- Various statutory and university of applied sciences regulations.
- Complaints, objections and appeals procedures.
- Studying as an elite athlete.
- Purpose and spirituality.

HAN Language Centre

HAN Language Centre can help you with all your language and translation needs. You can also sign up for various language courses, coaching sessions or workshops. HAN students receive a discount on all foreign language courses.

At HAN Language Centre you can also take a writing or spelling course. There is also a special course (in Dutch) for students with dyslexia. The courses are intended for both Dutch and international students.

Confidential counsellors

At HAN we treat each other respectfully. Unfortunately, incidents can occur in which you as a student or staff member have to deal with unacceptable and/or disruptive behaviour. If this happens, contact one of the confidential counsellors to discuss what you can do about it. You can choose which confidential counsellor you speak to. More information and the contact details of the [confidential counsellors](#) can be found on HAN Insite.

Complaints and Disputes Office

Do you have a complaint, dispute, objection or appeal? The first step is to try to work it out together, possibly with the support of the study coach. If this does not help, you should submit your complaint to the Complaints and Disputes Office. The Complaints and Disputes Office ensures that complaints and letters of appeal are delivered to the right persons within the HAN organisation. The office also takes care of the secretarial duties of the Examination Appeals Board.

E: Bureau.klachtengeschil@han.nl

T: 026-3691504

A: Verlengde Groenestraat 75 Nijmegen / Postbus 6960, 6503 CD NIJMEGEN

I: [Klacht en bezwaar \(han.nl\)](#)

Ombudsman

Do you have a complaint that does not fall under the existing complaints and appeals procedures? Then you can turn to an independent ombudsman. The ombudsman has a mediatory role.

The position is vacant at the moment. Discuss your complaint with one of the confidential counsellors. You can also go to the Complaints and Disputes Office.

INFORMATION FACILITIES

Student Affairs Enquiry Desk via ASK@han.nl

Do you have questions about your degree course? For example, about enrolment, payment of tuition fees, examinations, lecture timetables or the study information system (SIS)? You can ask the staff at the Student Affairs Enquiry Desk via ASK@han.nl.

Study and Multimedia Centres

The Study and Multimedia Centres offer a physical library collection at diverse HAN locations. The locations also have places to study and quiet zones.

On the website [HAN Study Centres - HAN Study Centres](#) you can find the digital collection, which you can also consult at home. Here you can also find study materials for the Information Skills lessons.

More information about the services, opening hours and contact details can be found on the website of the Study and Multimedia Centres: [HAN Study Centres - HAN Study Centres](#).

HAN Information Centre via ASK@han.nl

The staff at the HAN Information Centre can tell you everything about degree courses, forms of collaboration, promotional activities and the organisation of the entire HAN.

I: [Contact form \(hanuniversity.com\)](#)

International Office

HAN is also active internationally. The activities are extremely varied. For example, the International Office works on internationalisation of the curriculum, expanding the international network of partner universities, studying abroad for HAN students and lecturer exchanges. The International Office also coordinates HAN's efforts in three important internship projects for community work in South Africa, India and Curacao. Finally, the International Office offers practical support regarding scholarships (including Erasmus+) and filling in forms such as the Learning Agreement. The International Office is also the first point of contact for international students. The International Office is located in Arnhem (Ruitenberglaan 31) and Nijmegen (Kapittelweg 33). Drop by to ask your questions or visit the Insite page of the [International Office](#).

I: [International office \(hanuniversity.com\)](#)

OTHER FACILITIES AND SERVICES

Sports facilities

As a HAN student you can purchase a sports card. This allows you to use the sports facilities of HAN Seneca (the HAN centre for sport and health), the sports facilities of the Arnhem council and the sports facilities of Radboud University Nijmegen.

HAN Employment

HAN Employment mediates between employers and jobseekers doing a work-study or part-time degree course. HAN Employment also publishes vacancies for alumni.

HAN Employment offers companies the opportunity to post vacancies on the job bank.

Students doing work-study and part-time degree courses are offered training sessions (SollicitatieBoost) and

network sessions (Meet & Match).

Entrepreneurship

Students with entrepreneurial ambitions can come here for coaching/starter supervision, entrepreneurship education, help in applying for financing, networking and entrepreneurial events.

You can also contact the centre about doing an internship or graduation assignment in your own company. And HAN offers various minors on entrepreneurship.

Health and safety for students

Would you like to know more about the rules for safe and healthy work practices at HAN? Or do you want to know which resources we have in this area? Visit the special health and safety pages for students on Insite.

PART 2 Education and Examination Regulations

1 About the education and examination regulations

These education and examination regulations are included in the degree statute that apply to your degree course. The education and examination regulations are adopted each academic year. The education and examination regulations cover the education, exams, modular exams and final assessment for your degree course and your rights and obligations.

1.1 Terms and definitions

The terms and definitions used in these education and examination regulations are given below.

The Dutch term is given between brackets.

School (<i>Academie</i>)	An organisational unit with interconnected degree courses, research and knowledge services.
Graduation specialisation (<i>Afstudeerrichting</i>)	A specialisation within a degree course as defined in the education and examination regulations.
Assessment criteria (<i>Beoordelingscriteria</i>)	Clearly defined and unambiguous standards that can be used to give a motivated assessment of whether and to what extent a student meets the required level of knowledge, understanding and skills and (if relevant) attitude assessed in an exam or modular exam.
Assessment dimensions (<i>Beoordelingsdimensies</i>)	Assessment dimensions give a global description of the aspects on which a student's performance and/or the resulting products should be assessed. These descriptions need to be global because the assessment dimensions should apply to any type of student performance that demonstrates their qualification.
Professional task (<i>Beroepstaak</i>)	A meaningful, complete task as carried out in all its complexity by a professional practitioner in an actual professional setting with all its complexities.
Professional requirements (<i>Beroepsvereisten</i>)	Well-defined qualifications regarding the knowledge, understanding and skills and (if relevant) the attitude a student needs to carry out the profession they are studying for.
BRIN number (<i>BRIN-nummer</i>)	The Basisregistratie Instellingen (BRIN) is a database for educational institutions that is published by the Dutch Ministry of Education, Culture and Science. It contains all schools and related institutions. Each educational institution is identified in the database with a number. The BRIN number for HAN is 25KB.
Examination Appeals Board (<i>College van Beroep voor de examens</i>)	This is the board referred to in article 7.60 of the Higher Education and Research. The board deals with appeals submitted by students against decisions made by HAN.
CROHO	CROHO is the central register for degree courses in higher education.
Exit qualifications (<i>Eindkwalificaties</i>)	Well-defined outcomes regarding the knowledge, understanding and skills and (if relevant) the attitude a student should acquire by the time they complete their degree course.

Recognition of Prior Learning (<i>Erkenning Verworven Competenties, EVC</i>)	Recognition of prior learning gained outside the degree course that leads to a Certificate of Prior Learning from the Nationaal Kenniscentrum EVC, the national research centre for the recognition of prior learning. Recognition of prior learning can lead to exemption from exams and modular exams for unit(s) of learning outcomes or unit(s) of study that focus on the competences already gained through the prior learning.
External student (<i>Extraneus</i>)	A person enrolled at a university of applied sciences or university who can participate in exams, modular exams and final assessments but not in the education or supervision.
HAN	HAN University of Applied Sciences This abbreviation is used in internal documents to improve the readability of documents.
Head examiner (<i>Hoofdexaminator</i>)	Appointed by the board of examiners as the head examiner responsible for the results of examination and assessment in cases where more than one examiner has been appointed for an exam or modular exam.
Degree format (<i>Inrichtingsvorm</i>)	The manner in which a degree course is organised: full-time, part-time or work-study.
Register (<i>Intekenen</i>)	Registering for educational components, exams and modular exams. OSIRIS uses the term 'Enrol' for this.
Elective unit of study (<i>Keuzeonderwijseenheid</i>)	A unit of study that can be chosen from two or more elective units of study. Once selected, the unit of study becomes part of the student's study programme and final assessment. The exams and modular exams for the non-mandatory units of study that the student did not select do not need to be taken for the degree certificate.
Learning outcome (<i>Leeruitkomst</i>)	A measurable result of learning experiences.
Exams taken independently of the standard programme (<i>Leerwegaafhankelijk tentamen</i>)	An exam or modular exam that the student can take without having participated in the educational activities linked to that exam.
Module (<i>Module</i>)	An internally coherent and to some extent independent part of the part-time and work-study degree course. A module consists of one or more units of study and is aimed at a realistic cluster of qualifications derived from professional practice.
Module certificate (<i>Modulecertificaat</i>)	Written statement by the board of examiners that a student has successfully completed a module in a part-time or work-study degree format.
Unit of study / study unit (<i>Onderwijseenheid</i>)	A basic unit of HAN education that is aimed at achieving clearly defined objectives in terms of knowledge, understanding, skills and (if relevant) attitude. These are assessed in an exam and awarded a certain number of credits.
Degree committee (<i>Opleidingscommissie</i>)	The statutory public participation body as referred to in article 10.3c of the Higher Education and Research Act, which is responsible for e.g. guaranteeing the quality of the degree courses listed in Part 2, chapter 1.

SIS (Alluris/OSIRIS)	The HAN study information system. This academic year, HAN is switching from study information system Alluris to study information system OSIRIS.
Student	A person enrolled as a student in a degree course at HAN with the aim of participating in educational activities and sitting for exams and modular exams.
Study coach (<i>Studiebegeleider</i>)	A staff member responsible for the study coaching of one or more students.
Study load in hours (<i>Studiebelastinguur</i>)	A unit of 60 minutes that is spent on study and is used to measure the study load of each unit of study.
Academic year (<i>Studiejaar</i>)	The period starting on 1 September and ending on 31 August of the following year.
Credit (<i>Studiepunt</i>)	One credit is equal to 28 hours of study (this is an average indication).
Exam (<i>Tentamen</i>)	A test of the student's knowledge, understanding, skills and (if relevant) attitude in conjunction with each other. Also, the assessment of the results of that test. The exam is the concluding component of a unit of study or unit of learning outcomes.
Exam opportunity (<i>Tentamengelegenheid</i>)	An opportunity offered within the degree course to sit for an exam or modular exam.
Exam sitting (<i>Tentamenmoment</i>)	The sitting/time at which an exam or modular exam is administered/held.
Track with special feature (<i>Traject met bijzondere eigenschap</i>)	A degree track that distinguishes itself from the standard track because of a different duration, intensity, language or format. In all cases, the study load and the qualities in the area of knowledge, understanding and skills that a student has to acquire by the end of the track are the same as those of the degree course.
Deregister (<i>Uittekenen</i>)	When a student is registered for certain educational components, exams or modular exams, that student must deregister if they decide they no longer wish to participate. OSIRIS uses the term 'disenrol' for deregistering.
Exemption (<i>Vrijstelling</i>)	A decision made by the board of examiners that a student does not have to take exam(s) and modular exam(s) relating to one or more specific units of study. This decision is based on the board's opinion that the student already sufficiently masters the required knowledge, understanding, competences and/or skills and (if relevant) attitude.
Higher Education and Research Act (<i>WHW</i>)	Higher Education and Research Act (in Dutch: <i>Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek - WHW</i>).

Other terms and definitions have the meanings given to them in the national laws and regulations.

1.2 Which degree course(s) do these education and examination regulations apply to?

These are the education and examination regulations, as defined in article 7.13 of the Higher Education and Research Act, for the following HAN degree course(s) composed of units of study:

Degree course	Degree format	CROHO number	Location of the degree course
M Molecular Life Sciences		49293	Master of Science

These education and examination regulations do not apply to the following master course(s) composed of units of learning outcomes:

Degree course	Degree format	CROHO number	Where to find degree statute

1.3 Which education and examination regulations apply to you?

At HAN, the education and examination regulations are renewed every year. This does not mean everything changes each year. Generally only a small number of changes are made to the study programme and the organisation.

These education and examination regulations apply to the 2022-2023 academic year, so from September 2022 to 31 August 2023.

Amendments made to the education and examination regulations do not apply to events or matters in the past, but only to the new academic year. Special rules may apply when switching from 'earlier' education and examination regulations to new education and examination regulations. These rules can be found in the transition regulations: Part 2, chapter 8.

In exceptional cases the education and examination regulations must be amended during an academic year. Amendments can only be made during an academic year if this is reasonably necessary and does not disadvantage the students. Transition regulations may also apply in these cases: see Part 2, chapter 8. The overview of adopted amendments is included in Part 2, section 8.5.

In cases not provided for in these education and examination regulations, the dean will decide. If a case is subject to the authority of the board of examiners, a decision will be made by the chair of that board of examiners. Those with an interest in the decision will be informed of that decision within four weeks.

2 Regulations concerning admission

The rules concerning application, admission, admission requirements, selection and enrolment for all degree course(s) to which this degree statute applies, can be found in the Enrolment Regulations: School of Applied Biosciences and Chemistry..

This chapter contains the applicable rules for admission into the degree course and which by law must be included in the education and examination regulations.

2.1 Maximum number of admissions

Not applicable

2.2 Admission requirements

A requirement for admission to a master course is holding a bachelor degree from a university of applied sciences or university or possessing knowledge, understanding and skills at the level of a bachelor degree from a university of applied sciences or university.

The following specific requirements also apply to this degree course:

- Bachelors degree in the field of molecular life sciences (molecular biology, cell biology, biochemistry) or having the equivalent knowledge, understanding and skills according to the enrolment regulations,
- Professional use of English (B2 level of English according to the Common European Framework of Reference recommended)
- Practical lab research experience in the field of molecular life sciences during or after the bachelors course of at least 5 months.

If the applicant is unable to submit a degree certificate or other documents demonstrating that he or she meets the entry requirements, he or she may take an admission test to demonstrate that he or she meets the entry requirements.

2.3 Employment requirements for part-time degree course(s)

If you do the part-time format of this degree course, there are certain employment requirements. Those requirements also apply if you are self-employed. The units of study to which this applies to research and product development skills 1 & 2 and managing projects 1 & 2.

Those requirements are further detailed in the Enrolment Regulations and are included in the descriptions of the units of study in Part 2, chapter 6.

2.4 Workplace-learning agreement for the work-study degree format

Not applicable

2.5 Extra contribution

Not applicable

3 Description of the degree course

In this chapter you can read about the format and structure from the degree course. You can also read about the study load of the different units of study or modules offered in the degree course. This chapter contains a general description. Part 2, chapter 6 describes the exact content of the degree course.

3.1 Structure and format of the degree course

3.1.1 Structure of the degree course

The degree course consists of a coherent set of units of study. In the part-time and/or work-study degree format, units of study are grouped in modules.

The study load of a degree course is represented in credits. The study load of a unit of study is at least one credit. One credit is equal to 28 hours of study (this is an average indication). The study load of this master course is 120 credits.

Each year of study is structured so that the standard study load for a full-time degree format is 60 credits.

The standard study load of the part-time degree course is 60 credits per year of study.

You can follow the degree course in the following degree formats:

Full-time

Part-time

At location: Nijmegen.

The standard scheduled duration of the degree course is 2 years of study.

The part-time degree format has a standard scheduled duration of 2-4 years of study.

The structure of the study programme for this degree course is provided in Part 2, chapter 6.

3.1.2 Structure of the work-study degree format

Not applicable

3.1.3 Elective units of study

Not applicable

3.1.4 Graduation specialisation

Not applicable

3.2 Tracks with special features

Not applicable

3.2.1 Combined track

Not applicable

3.2.2 Other track with special feature

Not applicable

3.3 Language in which the units of study are offered

The degree course MMLS is offered in English.

The degree course also offers units of study/modules in a language other than Dutch. The units of study that are [also] offered in another language can be found in the overview of units of study in Part 2, chapter 6.

3.4 Extra educational components

As a student you can take one or more extra modules, units of study or units of learning outcomes at HAN. If you choose to do this, you will be expanding your study load. You can do this at HAN by:

- taking one or more extra modules,
- taking one or more extra units of study or units of learning outcomes.

You do not need approval from the board of examiners to participate in an extra module or one or more extra units of study or units of learning outcomes.

Capacity limits may apply for participation in an extra unit of study or an extra module.

Extra educational components are not part of the degree course. The results of extra educational components will be listed separately on the degree certificate.

3.5 If the content or structure of your degree course changes

We regularly change or update components of the study programme so we can guarantee the quality of the degree course and the value of your degree (certificate). This means the education and examination regulations for a following academic year may contain amendments to the study programme you will follow.

Changes to the study programme can have certain consequences. If you have a study delay, for example, you may need to pass a different exam or modular exam than you initially thought. A change may also mean an exam or modular exam is still offered, but you can no longer follow the educational activities for that particular component.

A change cannot mean that units of study or exams and modular exams you have already passed no longer count towards the final assessment. The law only allows this in highly exceptional cases.

The transition regulations in Part 2, chapter 8 stipulate, where needed, how this works for each change made to the study programme.

3.6 Registering for educational components offered from February 2023

For education offered after 31 January 2023, you need to register for the educational components you wish to follow. The 'OSIRIS Regulations for Education, Exams and Modular Exams' in Part 3 of this degree statute stipulates what is expected of you regarding registering and deregistering for educational components. The regulations also contain exceptions for situations where registering for an educational component is not necessary.

4 Study coaching and study facilities

The learning objective and basic principle at HAN is that you are responsible for your own learning process. We also want you to feel acknowledged during your entire time as a student. You are entitled to good study coaching. Each degree course offers support for this. If needed, HAN can also offer you academic, psychological and financial support. The HAN Study Success network offers you support for successful study progress.

4.1 What does HAN offer to assist you with your studies?

HAN offers facilities that enable you to do well in your studies. Examples of these are:

1. facilities for students with a disability;
2. facilities for pregnant students and students with informal care tasks;
3. special support for international students;
4. special support for students from minority groups.

HAN Study Success also offers support for successful study progress. Students who need this can get extra support. You can contact your study coach or HAN Study Success for more information about the facilities and coaching offered at HAN. See also Part 1, chapter 6

In addition to the general facilities, your degree course also offers at least the following facilities:

1. study coaching as described below;
2. two exam opportunities each academic year.

4.2 How is study coaching organised?

The study coaching starts with the introduction to the Study coach at the start of the academic year. In the first year of study, your personal Study coach will invite you to come and talk with them at least 3 times. Furthermore, study coaching is integrated in the education in the units of study.

General information about study coaching

The aim of study coaching is to support and guide students personally to optimal study success.

Though students work rather independently during their master education, personal attention is an important aspect of the master programme in Molecular Life Sciences. The study is seen as an integral part of the professional and private life of students and adjusted as much as possible to the needs of individuals.

For mastering the competences developed with the modules Research and Development Skills and Managing projects, the context of workplace plays a pivotal role.

Specific elements of study coaching

Study tutoring in the Molecular Life Sciences master course is based on the master level professionals are educated to. Each student has a study coach (tutor). Personal discussions of the student, student career coach and workplace supervisor will be scheduled on a regular basis. During these discussions, the competence development, study progress, learning goals and individual needs of students will be discussed. Furthermore, combining study with professional and private life can be subject of these discussions.

Next to the structural discussion, students can always contact their student career coach, lecturers, the programme coordinator or the administrative support (secretary) with specific questions or problems. There is an 'Open door policy'.

Personal requirements of students are met as much as possible and sensible with respect to the regulations,

practical feasibility and the student's study progress.

5 Exams and final assessment

This chapter covers, in general terms, the exams, modular exams and final assessment for your degree course.

5.1 Coherent set of units of study

The degree course consists of a coherent set of units of study that are stipulated and described in Part 2, chapter 6. For each unit of study there is an exam.

The degree course consists of a coherent set of units of study and modules in the part-time and work-study degree format that are stipulated and described in Part 2, chapter 6. For each unit of study there is an exam.

An exam can consist of two or more modular exams that have a predetermined weight factor and jointly determine the exam grade for the unit of study.

5.2 Exam

The result of an exam for a unit of study is used to determine whether the student has the knowledge, understanding and/or skills and (if relevant) attitude required to successfully complete that unit of study. The assessment dimensions and assessment criteria of the exams and modular exams are set out in Part 2, chapter 6.

5.2.1 Entry requirements

Some units of study have qualitative entry requirements for participating in the educational activities, exams and modular exams for that unit of study. You can request permission from the board of examiners to deviate from these entry requirements. The entry requirements are described in the units of study in Part 2, chapter 6. The following entry requirements apply to your degree course:

- You need to have passed one or more other specific exams or modular exams.
- You need to sufficiently master the language in which the unit of study is given.
- Successful completion of a unit of study

5.2.2 Mandatory participation

In some cases you may only do an exam or modular exam if you have actually participated in the educational activities for the unit of study belonging to that exam or modular exam.

Part 2, chapter 6, further stipulates which units of study have full or partial mandatory participation.

The board of examiners may grant full or partial exemption of mandatory participation. In that case, an equivalent requirement is imposed .

5.2.3 Exam format

The format of an exam or modular exam is specified in Part 2, chapter 6, in the description of the unit of study concerned. The board of examiners may deviate from this format in special cases, on request or at their own initiative.

5.3 The examiner

Each exam and modular exam is designed and assessed by one or more examiners, as decided and appointed by the board of examiners.

The examiner determines the outcome of the exam or modular exam and the result. If more than one examiner is

appointed, the head examiner sets the final result.

5.3.1 When have you passed an exam?

The examiner gives the result of an exam as a grade.

The result of an exam is expressed in one of the following numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

You pass the exam if you earn a grade of 6 or higher.

You fail the exam if you earn a grade of 5 or lower.

In the case of fraud, an F is recorded for the exam result in SIS.

5.3.2 When have you passed a modular exam?

The examiner gives the result of a modular exam as a grade.

A grade for a modular exam is rounded to a number with 1 decimal place.

Grades with the decimals 1, 2, 3 or 4 are rounded down.

Grades with the decimals 5, 6, 7, 8 or 9 are rounded up.

Contrary to the main rule above, the result of one or more modular exams can be expressed in a grade or in the qualification 'pass' or 'fail'. The unit of study descriptions in Part 2, chapter 6, specify which modular exams are assessed with a grade and which with a 'pass' or 'fail'.

You pass a modular exam if you earn a grade of 5.5 or higher or a 'pass' qualification.

You fail a modular exam if you earn a grade of 5.4 or lower or a 'fail' qualification.

In the case of fraud, an F is recorded for the modular exam result in SIS.

5.3.3 How is the overall grade calculated for an exam with modular exams?

When the overall grade for the exam is calculated, the grades earned for the modular exams are weighted as specified in the unit of study descriptions given in Part 2, chapter 6. The final exam grade is then rounded off as follows:

Exam grades with the decimal 1, 2, 3 or 4 are rounded down to whole numbers.

Exam grades with the decimal 5, 6, 7, 8 or 9 are rounded up to whole numbers.

5.3.4 Applicable result

The final grade for an exam or modular exam is the highest grade achieved. You are allowed to resit an exam or modular exam even if you pass it.

The unit of study descriptions in Part 2, chapter 6, stipulate if compensation regulations for exams and modular exams apply.

5.3.5 When do you get a 'pass/fail' qualification for an exam?

Contrary to section 5.3.1, a pass/fail can be given instead of a grade in the following cases:

- you have an exemption for one or more modular exams, so the result of that exam cannot be expressed in a grade,
- the HAN conversion tables do not apply.

5.4 Number of exam opportunities each academic year

You have two opportunities each academic year to take an exam or modular exam. The descriptions of the units of study in Part 2, chapter 6, specify how many exams and modular exams are conducted each academic year and in

which term.

Please note that if the degree course has more than 2 exam opportunities a year, you may still only use two of those opportunities.

In the following exceptional situations, the unit of study description in Part 2, chapter 6, may stipulate that only one opportunity will be offered each academic year to take an exam or modular exam:

- if the nature of the education and assessment of the unit of study make it impossible to offer a second opportunity. In that case, the student will always be notified sometime during the unit of study about whether their performance to date is sufficient for them to pass the exam or modular exam for that unit of study, or,
- if it is not possible to offer a second opportunity due to physical or logistic reasons and the next opportunity cannot be offered until the following academic year, and
- an alternative has been offered that prevents further study delay.

The student will be informed of this exception when they apply for the unit of study and, if possible, before the start of the academic year.

5.4.1 Registering for exams and modular exams

Part 2, chapter 6, describes whether, how and by which date you have to register for an exam or modular exam. Please note: For all exams and modular exams held after 31 January 2023, you need to register for the exam and modular exam opportunities you wish to participate in. The 'OSIRIS Regulations for Education, Exams and Modular Exams' in Part 3 of this degree statute stipulate what is expected of you regarding registering and deregistering for exams and modular exams held after 31 January 2023. These regulations also stipulate the exceptions for a number of situations where registration is not necessary for certain exams and modular exams.

5.4.2 Request for extra exam opportunity or different exam format

You can submit a request to the board of examiners for an extra opportunity for an exam or modular exam.

You can submit a request to the board of examiners to take an exam or modular exam in a different format.

The request must be motivated and include at least a description of the reason and importance.

The Regulations of the Board of Examiners (see Part 3) gives further details on the procedure.

5.5 Modified exam format

Do you have a disability or chronic illness, or is there another reason such as pregnancy that means you cannot participate in the regular format of the exam or modular exam? Then you can ask the board of examiners to conduct the exam or modular exam in a format adjusted to your situation.

The board of examiners will decide, if needed after consultation with you and the examiner, which format can reasonably be used for the exam or modular exam, which facilities will be offered and which different rules will apply.

5.6 Oral exams and oral modular exams

An oral exam or oral modular exam is conducted by means of a conversation between the examiner(s) and the student. Oral exams and oral modular exams are public. In special cases, the board of examiners can deviate from this rule. This decision will be announced and explained to everyone involved.

5.7 When is the result of an exam announced?

It depends on the exam format when the result of an exam or modular exam is announced:

- You will be informed of the result of a written exam or written modular exam within at least 15 working days. This result will be recorded in the study information system (SIS).
- The result of an oral exam or oral modular exam will be decided directly after the exam and announced within no more than 5 days. This result will be recorded in SIS.
- You will be notified of the result of a practical exam or practical modular exam immediately after the exam, or if that is not possible, within 5 working days. This result will be recorded in SIS.

]

A result entered into SIS may only be adjusted in the following cases:

- If a demonstrably incorrect result has been entered into SIS.
- In cases of fraud, deceit or impersonation.
- If an examiner has revised their assessment for a well-founded reasons.
- If you have lodged an appeal to the Examination Appeals Board or the Higher Education Appeals Tribunal against an assessment, the appeal is judged to be valid and the result has been revised by the examiner.

Has a result changed after being entered into SIS? Then you will receive notification of this.

5.8 Exams: review and discussion rights

You are entitled to receive further explanation about the assessment of your exam or modular exam. This is set out in the HAN rules on discussion and review rights below. Both the discussion and individual review are closely monitored to ensure no fraud takes place.

Discussion and review rights are organised as follows:

5.8.1 Group discussion

Within 10 working days after the results of an exam or modular exam, the examiner organises a group discussion, unless there is clearly no need for this among the students.

5.8.2 Review and discussion of individual work

After the group discussion or if there was no group discussion, you as an interested party are entitled to review and discuss your own work with your lecturer and the examiner, unless you could reasonably have already done this during the group discussion. You are allowed to review and discuss everything: the assessed exam or modular exam, the questions, assignments and grading system.

Students must have the option to review and discuss their own work within 6 weeks after the result.

5.8.3 Other exam formats

If an exam has been administered in a format that cannot be reviewed or discussed as outlined in the procedure above, the unit of study description in chapter 6 will specify how the review and discussion is organised. The same principles will be guaranteed as in sections 5.8.1 and 5.8.2 above.

5.9 Exams taken independently of the standard programme

An exam or modular exam taken independently of the standard programme is an exam or modular exam you can participate in without following any of the educational offerings of the unit of study. If you would like to participate in

an exam or modular exam taken independently of the standard programme, you can submit a motivated request to the board of examiners. The request must include at least a description of the reason and importance.

The board of examiners will make a reasoned decision within 20 working days based on the evidence submitted.

If this decision is positive, you can participate in the exam or modular exam. If the regular exam or modular exam is not suitable for this purpose, the board of examiners will appoint the examiners and decide on the exam format, in accordance with the relevant exit qualifications and assessment criteria given in Part 2, chapter 6.

5.10 When and how can you request exemption from an exam or modular exam?

Part 2, chapter 6 describes for each exam and modular exam which knowledge, understanding, skills and attitude you need to demonstrate and how they will be examined and assessed. You can request an exemption from the board of examiners for one or more exams or modular exams if you demonstrate that you already master the knowledge, understanding, skills and attitude associated with the exam or modular exam.

You can demonstrate this with:

- evidence showing you previously passed an exam in higher education;
- an official report showing recognition of prior learning;
- evidence that you gained the required knowledge, the required understanding and/or the required skills elsewhere.

The learning outcomes assessment criteria of the exams and modular exams as specified in Part 2, chapter 6, form the guidelines for the board of examiners to grant the exemption.

Instead of a grade or the 'pass' qualification, you receive the qualification of 'exemption' for an exam or modular exam.

The procedure for granting exemptions can be found in the Regulations of the Board of Examiners (Part 3).

The board of examiners may designate certain previously passed exams and modular exams and/or any previously earned credits and degree certificates as entitling students to exemption from one or more exams or modular exams.

The designated exams, credits and certificates are outlined in an appendix to the Regulations of the Board of Examiners. The board of examiners may also consider these as grounds for exemptions from one or more exams or modular exams for units of study that are part of abridged tracks.

5.11 Final assessment

You pass the final assessment if you have passed all of the exams related to that final assessment. This will differ if the board of examiners has specified that an extra assessment is needed of your knowledge, understanding and skills. In that case, you will also need to pass that extra assessment (exam). Only then will you pass the final assessment.

5.11.1 Cum laude

If you pass all the exams that count towards the final assessment with a grade of 8 or higher on your first attempt, you will pass that assessment 'cum laude'. These are the overall exam grades for each unit of study; separate grades for the modular exams are not taken into account. If an exam comprises several modular exams, only the grades for the modular exams that were passed on the first attempt will count towards the required grade of 8 for the exam. One exception can be made to this rule. This exception is that a student may resit one modular exam and the highest result then counts towards determining whether they receive the 'cum laude' distinction. If an exam does not consist of several modular exams, students can resit that exam.

Exams that are part of an increase of your study load, as described in Part 2, chapter 3, are not taken into consideration when determining the 'cum laude' distinction.

You may earn no more than 60 credits in exemptions or 'pass' qualifications in the degree course.

5.11.2 With merit

If you pass all the exams that count towards the final assessment with a grade of 7 or higher on your first attempt, you will pass that final assessment 'with merit'. These are the overall exam grades for each unit of study; separate grades for the modular exams are not taken into account. If an exam comprises several modular exams, only the grades for the modular exams that were passed on the first attempt will count towards the required grade of 7 for the exam. One exception can be made to this rule. This exception is that a student may resit one modular exam and the highest result then counts towards determining whether they receive the 'with merit' distinction. If an exam does not consist of several modular exams, students may resit that exam.

Exams that are part of an increase of your study load, as described in Part 2, chapter 3, are not taken into consideration when determining the 'with merit' distinction.

You may earn no more than 60 credits in exemptions or 'pass' qualifications in the degree course.

5.12 Overview of results, supporting documents, and declarations

5.12.1 How to request a - certified - overview of your study results

You can make a printout of your exam results as recorded in study information system. If you want to use this overview as an official document outside HAN, you can submit a request to the Student Affairs Enquiry Desk, via ASK@han.nl for a certified overview of study results. This certification does not guarantee that the relevant authorities will also consider the document official.

5.12.2 Exam documentation

You will receive signed documentation from the examiner for each exam or modular exam you take. This may be a digitally signed document. It gives the name and code of the exam or modular exam, the unit of study, and your result. The examiner is required to provide you with this document.

Keep these documents in a safe place.

5.12.3 Statement

If you quit the degree course and are not entitled to a degree certificate, but you have passed more than one exam, you will receive, on request, a statement from the board of examiners listing the exams you passed, for which degree course, how many credits you earned for these exams and, if applicable, the programme for which the statement is being issued. This statement includes an appendix with a certified grades list.

5.12.4 Module certificate

Not applicable

You receive a statement from the board of examiners for each module you have passed. This statement specifies the name of the module, the units of study within the module, the accompanying study load and the results you obtained for the exams.

5.13 Degree certificate, degree and diploma supplement

5.13.1 Degree and degree title

Once the board of examiners has confirmed you have passed the final assessment, the Executive Board will award

you the degree for your degree course. This degree comes with an official abbreviation you can place after your surname in the Netherlands and abroad.

You will receive the following degree: Master of Science for the degree course in accordance with the law. See the Regulations for academic titles in higher education (Regeling titelatuur hoger onderwijs) at overheid.nl

The abbreviation related to this degree is: MSc. See the Regulations for academic titles in higher education (Regeling titelatuur hoger onderwijs) at overheid.nl.

This degree title is also stated on the certificate.

5.13.2 Master degree certificate and diploma supplement

Once the Executive Board has awarded the degree confirmed that you are enrolled in the degree course at HAN and have met all your financial requirements towards HAN, the board of examiners will award you the degree certificate for the master course and the corresponding diploma supplement in English.

Please note that from the moment OSIRIS is put into use as the study information system, the following applies: Once you have passed all the exams for the degree course, you can apply for your certificate through OSIRIS. Only after you apply, the board of examiners checks whether you have indeed passed all exams for the degree course, whether you are enrolled in the degree course, and whether you have met all your financial obligations towards HAN. Following this, the board of examiners will award the degree certificate and the accompanying diploma supplement in English. The official date of graduation is the day the board of examiners determines that you have earned all the required credits.

5.13.3 Different issuing date for master degree certificate

You can request the board of examiners to postpone issuing your degree certificate. This postponement can be granted for no more than two years.

Please note that from the moment OSIRIS is put into use as the study information system, the following applies: if you do not want to graduate after you have passed all the exams in your degree course, you need to submit a request to the board of examiners to postpone issuing your degree certificate.

You can postpone graduation for up to two years. If you do not reapply for the degree certificate within two years, your degree certificate will automatically be issued in OSIRIS after no later than two years.

If you do not apply for your certificate after you have passed all exams, and you do not request a postponement within the set time frame, the board of examiners will:

issue your degree after two years of passing all exams.

5.14 Appeal

You can lodge an appeal with the HAN Examination Appeals Board against a decision concerning education, exams, modular exams and final assessments within 6 weeks based on the education and examination regulations.

For more information about which decisions you can appeal and how, go to HAN Insite Complaints and Disputes Office:

<https://www1.han.nl/insite/en/students/contact/complaints-disputes-unacceptable-behavior/examination-appeals-board/>

6 Description of the education (the units of study)

This chapter describes your degree course in the form of a curriculum overview and description of the units of study. It also specifies whether the course offers modules and of elective units.

Name of degree course: MMLS			
CROHO number: 49293			
Degree format	Full-time	Part-time	
Language	English	English	
Variants and tracks			

Below is a schematic overview that gives you an overall impression of the degree course. It also gives the units of study or modules in the degree course.

6.1 Units of study

See Appendix to chapter 6 description of the education.

6.2 Graduation specialisations

Not applicable

6.3 Other

Not applicable

7 Evaluation of the degree course

7.1 Evaluation structure

A quality framework has been adopted for all HAN degree courses. This is in line with the accreditation framework of the Accreditation Organisation of the Netherlands and Flanders (NVAO) and the education policy formulated by HAN. This framework stipulates, among other things, that regular evaluations must be held among students, graduates, the professional field and staff.

HAN also carries out evaluation studies to support the evaluations done at degree course level.

Each year all HAN degree courses participate in the National Student Survey (NSE) in which students indicate how satisfied they are with different aspects of their degree course.

Every year an alumni survey is held via the HBO-monitor. This evaluates for each degree course how alumni look back on their degree course and how well it was geared to the labour market in their experience.

HAN students who leave a degree course without a degree certificate are contacted to enquire about their reason for leaving. Also, study progress and drop-outs are monitored for each degree course.

Every six years an accreditation is held by the NVAO, with external reviews beforehand by a committee of experts. Halfway through the accreditation cycle, an audit is conducted by an internal committee complemented by an external expert in the relevant field. The aim is to monitor and test the progress of improvement measures relating to the last external assessment of the degree course. This internal audit results in a report with improvement recommendations for the dean, for the degree committee and for those responsible for the course content.

The audit is conducted according to HAN guidelines. It includes quality assurance with regards to administrative and educational law and good implementation of the education and examination regulations.

7.2 Evaluation by the degree course

The core team is responsible for the structure and the quality of the degree course.

Each year the dean adopts an annual quality assurance report on the degree course. This document, along with the internal audit report or review report, forms the basis for dialogue about the quality of the degree course. This report concerns the improvement activities that were agreed on for the reported year, how they were executed and what results they delivered.

Based on the analysis of evaluation data for the reported year, a description follows of the improvement activities to be implemented in the current year. The evaluation data come about through evaluations of units of study, annual evaluations and curriculum evaluations by lecturers, students, alumni and the professional field. Also through evaluation studies conducted centrally by HAN.

The core team and/or the degree committee, curriculum committee and the board of examiners are involved in this cycle at degree course level by means of a brief response to this. Their responses are included in the appendixes to the annual report.

7.3 Role of the degree committee

The tasks, role and responsibilities of the degree committee in the evaluation are set out in the Regulations of the Degree Committee (see Part 3). The degree committee can also take the initiative to conduct specific evaluations.

7.4 Degree-specific quality assurance

Different stakeholders, which are students, professional field (professional advisory committee, the HAN Research group Industrial Microbiology and diverse other contacts), lecturers and alumni are involved in the quality assurance cycle. They are formally asked about their opinion about various quality aspects of the programme on a regular bases, and are stimulated to give informal feedback. Evaluation scores are compared to targets. Possible causes for scores lower than targets are discussed, and improvement actions are initiated, carried out, communicated and evaluated. By continually going through Deming's Plan-Do-Check-Act cycle (PDCA cycle), the programme aims for continuous improvement of the quality of the programme.

In addition, the external supervisor has the task to give feedback on the realization of the final qualifications, their assessment and teaching supporting students in acquiring these.

8 Transition regulations

8.1 Effective date for amendments

An amendment to the education and examination regulations can only become effective as of 1 September in the following academic year. Exceptions to this rule are clerical error, force majeure, fulfilment of legal regulations or when the amendment is in your favour.

This chapter sets out the rules for respecting acquired rights and legitimate expectations.

8.2 Obtained credits and study results

The result of an exam and its corresponding credits remain valid until the board of examiners has made a substantiated decision that the examined material is so outdated that it can no longer be used in the profession and the term of validity has expired as of a date stipulated by the board of examiners.

Results obtained for modular exams remain valid, and may – if they still fit in the new programme – lead to exemptions for modular exams.

8.3 Participation in education, but not in (modular) exam or has not passed (modular) exam

A student who has participated in the educational activities for a unit of study in the academic year prior to the programme amendment, but who has not completed an exam or modular exam or has not passed an exam or modular exam, is entitled to repeat the educational activities at least during the academic year in which the amendment takes effect, and is entitled to at least two opportunities to take the (modular) exam.

The board of examiners can deviate from this in exceptional cases, in the favour of the student.

If you like, you can directly choose the new programme structure and register for a renewed or modified unit of study. By doing so, you waive your rights concerning the transition rules.

8.4 Degree-specific transition regulations

UOS in previous study years	Equal to UOS in 2022-2023	Brief commentary	Option to take old (modular) exams	Deviating provisions with respect to old UOS and (modular) exams

Drug Discovery and Development	Drug Discovery and Development	<p>From 2018-2019 onwards, Structure Elucidation Analysis (DRD-SEA) is part of the examination of this module</p> <p>From 2020-2021 onwards, the study load of the Drug Discovery and Development module is 10 ECTS due to its actual study load.</p>	Yes, students of 2016 year group	-
Vaccines and Diagnostics	Vaccines and Diagnostics	From 2021-2022 onwards the summary for the financial department is not part of the Vaccine Development proposal anymore.	Yes, students of 2019 year group and earlier take the old modular exam.	-
Graduation project	Graduation project	From 2020-2021 onwards, the assessment of the Graduation project changed. The assessment consists of 4 modular exams instead of one integral exam.	Yes, student groups of the 2018 year group and earlier can take the old integral exam for the "Graduation project".	-

8.5 Adopted amendments to this degree statute

Not applicable

[Describe the amendments here].

In this section you will find a description of the adopted amendments on [date of adopted amendment(s)] as referred to in Part 1, under 'Adoption':

[Describe the amendments here].

In this section you will find a description of the adopted amendments on [date of adopted amendment(s)] as referred

to in Part 1, under 'Adoption':

[Describe the amendments here].

PART 3 Other regulations

1 Exam Regulations

1 Exam Regulations

These regulations stipulate the following:

1. The rules of conduct for students in written and digital exams and modular exams, insofar as these are not laid down in the Student Charter and the Education and Examination Regulations or related regulations.
2. The rules of conduct for students in review sessions and discussions of exams and modular exams, insofar as these are not laid down in the Student Charter and the Education and Examination Regulations or related regulations.

1 Code of Conduct for students during exams

The facilities provided by HAN for students with respect to exams and modular exams are laid down in the Student Charter and Education and Examination Regulations or related regulations. There is a code of conduct for students. In addition to general provisions, this code of conduct also contains provisions governing the conduct of students at exam venues. These exam regulations contain additional provisions regarding student behaviour during written and digital exams in particular.

Behaviour

The student:

1. follows the instructions given by the supervisor and treats him/her with respect;
2. behaves in such a way that he/she does not disturb other students at any time during the exam or when entering or leaving the exam venue. The student is must be silent before, during and after the exam when in and near the room where the exam is being held;
3. contacts the supervisor a.s.a.p. if anything is unclear before and/or during the exam.

Identification and admission

The student:

1. reports to the supervisor 15 minutes before the start of the exam at the exam room;
2. will only be admitted to the HAN exam if they can identify themselves with a valid student card or a valid proof of identity. This means:
 - a passport;
 - a European identity card;
 - a Dutch driving licence;
 - a European driving licence;
 - a Dutch residence permit.
3. if a student is sitting for a national exam they may only identify themselves with proof of identity;
4. must place his/her valid student card or other form of identification at the top right-hand corner of the desk during the exam so the supervisor can check his/her identity;
5. will have their name checked off the attendance list by the supervisor to confirm his/her participation in the exam;
6. must immediately inform the supervisor if they are not listed on the attendance list. That student will only be given the opportunity to participate in the exam if the course department or school has given prior approval for additions to the attendance list.

Theft/loss of identification

If the student is unable to show identification due to theft or loss, they can apply for a certificate of registration at the Exams Office, which will give them admission to the exam venue. This certificate will only be issued if the student can show the original police report and/or official request to the municipal authorities for new identity papers. The student needs to apply for the certificate well in advance of the exam.

Before the start of the exam

The student:

1. may only place items needed to complete an exam on/next to the table;
2. may not – unless expressly stated otherwise – have any of the following in their possession during the exam: digital data carriers or equipment with an integrated digital data carrier, such as USB flash drives, calculators, special watches, special glasses, special earphones, etc.;
3. may not wear a watch. A clock is provided in all exam venues;
4. may not – unless expressly stated otherwise – use the following resources during the exam: hard-copy versions of dictionaries, law books, textbooks, etc.; if these resources are permitted, they may be checked by the supervisors;
5. must put their coat, scarf, hat, bags, cases, mobile phone(s), smartphone(s), digital data carrier(s) and any equipment with an integrated digital data carrier(s) in the place specified by the supervisor;
6. must turn off mobile phones, smartphones, etc. before putting them away;
7. must write their name, student number, class/group and other details requested by the supervisor on all exam documents at the start of the exam. The student must also write his/her name on any note paper he/she uses;
8. will not have direct access to the exam venue after the actual start of the exam. Students who do not make it to the exam venue on time are still allowed to enter the exam venue 30 minutes after the actual start of the exam and are allowed to sit the exam for the remainder of the exam time. The supervisor makes a note of which students are late. Students strictly observe instructions given by the supervisors regarding where they are allowed to sit and they do not disturb students who have already started the exam.

During the exam

The student:

1. may not take toilet breaks during exam sessions of 120 minutes or less. During exams that last longer than 120 minutes, students may take a toilet break after 120 minutes if accompanied by a supervisor. Exceptions are possible for all exams in cases of physical discomfort, provided the supervisor is notified no later than 15 minutes before the start of the exam or immediately upon entry when arriving 30 minutes after the start of the exam;
2. may not leave or submit their work during the first 30 minutes of the actual start of an exam (to prevent disruption to other students and/or irregularities); If there are any students who enter the exam venue 30 minutes after the start, any students who want to

- leave may only do so after the late students have started their exam;
3. will be given access to additional exam facilities if they are entitled to those facilities in accordance with a study contract or a decision to that effect by the board of examiners. These facilities apply if the student has registered for the exam well in advance;
 4. may not consume any food during exams that last less than 150 minutes; students may consume food during exam sessions of 150 minutes or longer if this does not cause a nuisance to fellow students;
 5. may only consume drinks from a resealable bottle/container;
 6. must use the writing materials specified on the cover sheet (black or blue pen or lead pencil) to complete the exam;
 7. must ensure that multiple-choice forms are filled in correctly and according to the instructions given by the supervisor;
 8. may not copy an exam or parts thereof in any way or take the exam or its contents outside the exam venues in any manner.

Resources

The student:

1. may not use resources other than those permitted. The permitted resources will be announced in advance by the course department and will be listed on the exam cover sheet;
2. must ensure that resources do not have notes, etc. on them unless the exam cover sheet states that this is permitted.

Suspected irregularity

The student:

1. will be referred to Part 2 of the degree statute (the education and examination regulations), and Part 3, chapter 3, of the degree statute (the regulations of the board of examiners) for provisions concerning irregularities or fraud, penalties for irregularities or fraud and confiscation of evidence;
2. will be permitted by the supervisor to complete the exam in the event of a reasonable suspicion of an irregularity or fraud and will sign the 'Form for suspected irregularity or fraud' (filled in by the supervisor) to confirm they have seen it.

Handing in exam documents

The student:

1. checks before handing in the exam script and assignment(s) whether their name, student number, class/group number and any other details requested by the supervisor have been written correctly on all of the exam documents to be submitted;
2. submits all the exam documents including used and unused note paper to the supervisor and signs the attendance list for confirmation;
3. makes sure everything is left neat and tidy before leaving the exam venue.

2 Code of conduct for students during review/discussion sessions of assessed exam work

There is a code of conduct for students. In addition to general provisions, this code of conduct also contains provisions governing the conduct of students at exam venues.

Below are additional regulations regarding the review of assessed exam work, hereafter referred to as 'review'.

Before the review: Only students who have taken part in the exam for which the review is organised may be present in the classroom. A lecturer and a supervisor will be present during the review.

Behaviour

The student:

1. follows the instructions given by the supervisor and treats him/her with respect;
2. should behave in such a way that he/she does not disturb other students at any time during the review or when entering or leaving the room in which the review takes place (hereafter referred to as the 'room');
3. must contact the supervisor a.s.a.p. if anything is unclear during the review.

Identification and admission

The student:

1. must show the supervisor a valid student card or another valid form of identification:
 - a passport;
 - a European identity card;
 - a Dutch driving licence;
 - a European driving licence;
 - a Dutch residence permit.

If the student cannot show a student card or a valid form of identification, they will not be allowed to take part in the review/discussion.

In the case of theft or loss of the identity document, the student can apply for a certificate of enrolment at the Exams Office, which will give them admittance to the room. This certificate will only be issued if the student can show the original police report and/or official request to the municipal authorities for new identity papers.

2. should have their name checked off the attendance list by the supervisor to confirm their participation in the review/discussion;
3. must place their valid student card or other form of identification at the top right-hand corner of the desk during the review/discussion so the supervisor can check their identity.

Start and resources

The student:

1. must ensure they have a copy of their answer sheet (yellow carbon copy) when reviewing a multiple-choice exam with OMR answer sheet;
2. may only place on the table the permitted resources that are listed on the review cover sheet or that are announced by the supervisor at the start of the review;
3. may not – unless expressly stated otherwise – have any of the following in his/her possession during the review: digital data carriers or equipment with an integrated digital data carrier, such

as mobile phone, smartphone, USB flash drive, calculator, special watch, special glasses, special earphones, etc.;

4. must put their coat, scarf, hat, bags, cases, mobile phone(s), smartphone(s), digital data carrier(s) and any equipment with an integrated digital data carrier(s) in the place specified by the supervisor;
5. must ensure their mobile phone(s), smartphone(s) or other digital data carrier(s) and any equipment with integrated digital data carrier(s) are switched off before putting them away;
6. must carefully complete all requested details on the protest form.

During the review/discussion

The student:

1. may not take a toilet break during the review;
2. may not eat anything during the review;
3. may only consume drinks from a resealable bottle/container;
4. may only place one or more of the following permitted documents on the table:
 - a. assessment form
 - b. yellow carbon copy (of the multiple-choice exam with OMR answer sheet)
 - c. exam script
5. may not make any annotations or amendments to the completed exam script. If the student does this anyway, it is reported to the board of examiners as an irregularity.
6. may not copy or take with them any model answers or assignments. Neither may students copy their own exam scripts and/or those of other students.
7. may not copy an exam or parts of an exam in any way or take the exam or its contents outside the exam venues by any other means.

Suspected irregularity

You can refer to the applicable provisions in Part 2 of the degree statute (the education and examination regulations) and Part 3, chapter 3, of the degree statute (the regulations of the board of examiners) for the applicable provisions concerning irregularities or fraud, sanctions for irregularities or fraud and confiscation of evidence.

Submitting reviewed (assessed) exam work

The student:

1. submits all the exam documents received for review to the supervisor and signs the attendance list to confirm this;
2. must make sure everything is left neat and tidy before leaving the room.

3 Final provisions

Unforeseen circumstances

In exceptional situations and cases not provided for by these regulations and in which an immediate decision is necessary, the decision will be taken by:

- a. the head of the exams office (in so far as this is within the powers of the exams office);
- b. the examiner (in so far this is within their powers);
- c. the chair of the board of examiners (in so far as this is within their powers);
- d. the supervisor, in consultation with the coordinating supervisor if it is not possible to wait until one of the above authorised people is present.

The interested parties will be informed of the decision as soon as possible.

Complaints and appeals concerning decisions and procedures of the exams office

For more on this, see these HAN regulations:

- 'Complaints Regulations';
- 'Regulations for Legal Protection of Decisions Concerning Education'.

4 Appendix

Formulier geconstateerde vermoedelijke onregelmatigheid of fraude **Form for suspected irregularity/fraud**

Naam surveillant *Name of supervisor*

.....
Naam student *Name of student*

.....
Studentnummer *Student number*

.....
Code/naam tentamen *Code/name of exam*

.....
Datum *Date*

.....
Tijdstip van de vermoedelijke onregelmatigheid of fraude *Time of suspected irregularity/fraud*

.....
Tentamenlokaal *Exam room*

.....
Plaats *Place*

.....
Beknopt verslag door de surveillant van het gebeurde:
Brief written report of the events by the supervisor:

Korte reactie van de student (je bent niet verplicht dit in te vullen, je krijgt nog de kans je verhaal te doen bij de examencommissie):

Brief response by the student (you are not required to fill out this form, you will still have the opportunity to tell your story to the Board of Examiners):

Handtekening surveillant *Supervisor's signature*

.....
Handtekening 'voor gezien' van student

Student's signature to confirm he/she has read the form

.....

De surveillant grijpt in geval van een redelijk vermoeden van een onregelmatigheid of fraude direct in. Hij laat de student onder voorbehoud het tentamen afmaken en neemt alle bescheiden in waarmee de vermoedelijke onregelmatigheid/fraude heeft plaatsgevonden. De surveillant vult dit formulier in en levert dit met alle bescheiden na afloop van het tentamen direct in bij de coördinator-surveillant. De student ontvangt een kopie van het ingevulde formulier. Via het Tentamenbureau gaat het formulier vervolgens naar de examencommissie. De examencommissie neemt contact op met de student.

The supervisor intervenes immediately in case of a suspected irregularity or fraud. He or she provisionally allows the student to finish the exam, and seizes all documents that he or she suspects are involved in the suspected irregularity/fraud. The supervisor fills in this form and submits it to the coordinating supervisor along with all accompanying items immediately after the exam. The student in question receives a copy of the completed form. The form is then sent to the Board of Examiners via the exams office. The Board of Examiners will contact the student.

2 OSIRIS Regulations for Education, Exams and Modular Exams

2 OSIRIS Regulations for Education, Exams and Modular Exams

1. Regulations for Registration and Deregistration in Educational Components, Exams and Modular Exams in OSIRIS

1. Registering for educational components¹

- a. You need to register for the educational components in which you plan to participate. If you have not registered, you cannot participate in the educational component.
- b. The degree course may specify that a maximum number of students can participate in a certain educational component. If applicable, this is stated in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Description of the education'.
- c. The degree course may decide that registration is not required for a certain educational component². If applicable, this is specified in the description of the educational component in Part 2 of this degree statute (the Education and Examination Regulations), in the chapter 'Description of the education'.
- d. You do not need to register for educational components in the first term of the first academic year of a full-time degree course starting in September or February³. If registration is required in the first term for certain electives, this will be specified in Part 2 of this degree statute (the Education and Examination Regulations), in the chapter 'Description of the education'.

2. Periods in which you can register for educational components

- a. Registration is open from 20 working days before the start of the educational component until 10 working days before the start of the educational component date (see annual timetable SABC). If a different period has been set for certain education components, this period can be found in the description of that specific component in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Description of the education'.
- b. A different registration period may be set for the education related to minors. This period can be found in the description of that specific educational component in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Description of the education', for the degree course offering the minor.

3. Registering for educational components after the deadline

- a. You can no longer register after the deadline has passed. You can submit a request for post-registration⁴ to the relevant (propaedeutic/ post-propaedeutic phase) coordinators and by sending an e-mail to ask@han.nl, no later than the day before the start of the educational component.
- b. You will be granted permission if there is no maximum number of students as referred to in article 1 under b and if the format of the degree course allows for post-registration.
- c. If a maximum number of students is specified, you will still be given permission if this maximum has not yet been reached and if the format of the educational component allows for post-registration.
- d. The degree course may decide post-registration is not possible for certain educational components. If applicable, this is specified in the description of the specific educational

¹ This includes the 'educational arsenal' of degree courses in units of learning outcomes.

² This is only possible if the degree course arranges the registration.

³ The degree course will register first-year students in the educational components for the first term.

⁴ Explanation: this means requesting to still be allowed to participate in the educational component, with the consequence that (if permission is granted) you will be registered by Study Progress.

component in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Description of the education'.

4. Deregistering for educational components

- a. If you do not want to participate in an educational component for which you have registered, you must deregister no later than the day before the start of the educational component.
- b. When you deregister, the automatic registration for the first exam sitting is cancelled as stipulated below in article 5 under b.

5. Registering for exams and modular exams

- a. You need to register for exams and modular exams in which you want to participate. If you are not registered for an exam or modular exam, you cannot take that exam.
- b. There is one exception to this rule: when you register to participate in an educational component, you are automatically registered for the first exam or modular exam opportunity for that component. If you want to participate in a different exam or modular exam sitting, you need to deregister (see article 8 below). If you do this, don't forget to register for the exam sitting you want to participate in.

6. Registration periods for exams and modular exams

- a. Registration for exams and modular exams is open from 20 working days before the start of the exam period until no later than 10 working days before the exam date (see annual timetable SABC).
- b. If a different period has been set for certain exams and modular exams, this period can be found in the description of that specific educational component in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Description of the education'.

7. Registering for exams and modular exams after the deadline

- a. You can no longer register after the deadline has passed. You can submit a request for post-registration⁵ to the education office of SABC (academiebureau.atbc@han.nl) and ask@han.nl up until 09:00 AM one working day before the exam or modular exam sitting.
- b. You will be granted permission if the organisation (required capacity and support) of the exam or modular exam allows for post-registration. If, in view of the facilities or support already arranged by HAN, it is not possible for you to participate in the exam or modular exam, you will not be allowed to register after the deadline. If no additional facilities, capacity or support is needed for the post-registration or if these have not already been arranged, you will receive permission for post-registration⁶.

8. Deregistering for exams and modular exams

- a. If you decide not to participate in the exam or modular exam, you must deregister prior to the exam or modular exam sitting.
- b. Deregistering for an exam or modular exam can be done up to one working day before the exam or modular exam sitting.
- c. If you are registered for an exam or modular exam, but do not participate and do not deregister, this will count as an exam opportunity used and an 'ND' will be recorded for the exam or modular exam result in SIS. If there were special circumstances that prevented you from deregistering and/or from participating, you may apply to the board of examiners for an additional exam opportunity. See the section 'Request for extra exam opportunity or another

⁵ Explanation: this means submitting a request to still be allowed to participate in the exam or modular exam, with the consequence that (if permission is granted) you will be registered by Study Progress.

⁶ After the deadline has passed, HAN will arrange exam rooms (and supervisors) for those who have registered. If, for example, there is still one seat left in a room, a student who requests post-registration just after the registration deadline may be permitted to participate. If a second student makes a request, their request will be rejected, because the room will then be 'booked up'. This means that as long as facilities have not yet been arranged, a student's request cannot be rejected and post-registration is still possible.

exam format' in Part 2 of the degree statute (the education and examination regulations), in the chapter 'Exams and final assessments'.

9. Technical problems

If you encounter problems while registering or deregistering for educational components, exams or modular exams and you are unable to register or deregister, report this by email or in person to the education office of SABC (academiebureau.atbc@han.nl) or by email to ask@han.nl before the end of the registration period.

10. Effective date of these regulations

These regulations will come into effect as soon as HAN starts using the OSIRIS student registration system and will apply to educational components, exams and modular exams held after 31 January 2023. The course department will ensure proper communication with students about when they need to start registering for educational components, exams and modular exams through OSIRIS.

3 Regulations of the Board of Examiners

REGULATIONS OF THE BOARD OF EXAMINERS 2022-2023

Section 1: General Provisions

Article 1.1 Terms and definitions

The terms and definitions applied in these regulations are those set out in Section 1.1 of the Education and Examination Regulations.

Article 1.2 Status and scope of these regulations

1. These regulations contain rules about the duties and powers of the School of Applied Biosciences and Chemistry board of examiners and measures they may take in this context, as well as rules about the implementation of those measures.
2. These model regulations are adopted annually as part of the model degree statute by the Executive Board with approval from the participation council.
The board of examiners may change paragraphs, articles and sections, provided the changes do not conflict with the degree-specific Education and Examination Regulations (EER), the HAN Student Charter or the Higher Education and Research Act (*Wet op het Hoger onderwijs en Wetenschappelijk onderzoek*, WHW).
3. These regulations were adopted by the board of examiners and apply to (the units of learning outcomes/study, exams, integrated exams and final assessments for) the
 - Bachelor degrees: Bioinformatics, Biology & Medical Laboratory Research, Life Science and Chemistry.
 - Master degree: Master of Molecular Life Sciences

Section 2: Decision-making and Mandates, Tasks and Meetings

Article 2.1 Decision-making and Mandates

1. The chair of the board of examiners signs decisions by the board of examiners, unless this duty has been delegated to someone else.
2. The board of examiners can appoint a managing committee for matters concerning day-to-day affairs, a daily committee (DC). This committee is composed of the chair of the board of examiners and another member and – insofar as this position is occupied – is supported by the official secretary. The managing committee is authorised to make provisions for current matters based on a general mandate. When the DC is unable to agree on a decision, the situation will be promptly brought to the attention of the board of examiners.
3. The board of examiners can be supported in its activities by an official secretary.
4. The duties delegated by the board of examiners are listed in appendix 1 to this set of regulations. The board of examiners remains fully responsible for any duties and/or powers it delegates to others.
5. The duties delegated by or on behalf of the Institutional Board to the board of examiners are listed in an overview in Appendix 2.
6. The board of examiners ensures that it regularly receives written reports on the duties and powers that it has delegated to other persons or bodies.

Article 2.2 Duties and Powers of the board of examiners

The board of examiners has the following duties and powers:

1. Ensuring the quality of exams and final assessments.
2. Adopting guidelines and instructions in addition to the EER about making objective, reliable, valid and transparent assessments of modular exams, integrated exams and final assessments and grading those exams.
3. Deciding to invalidate results for exams and modular exams and the corresponding ECTS credits. Also deciding on what date the validity of these exam results expires. This is only done in cases where reasoned arguments can be given showing the knowledge, understanding and/or skills are so outdated that they are no longer useful for the profession.
4. Deciding on student requests for exemptions. If a decision is later shown to be based on incorrect evidence submitted by the student, the board of examiners is authorised to withdraw the decision.
5. Deciding that certain previously passed exams and modular exams, certificates and other declarations, diplomas and certificates entitle a student to exemptions for one or more exams and/or modular exams. An overview of designation orders for groups of students can be found in Appendix 3 of these regulations.
6. Determining further rules and regulations regarding possible fraud and/or irregularities on the part of students, prospective students or external students, including any measures to be taken.
7. Adopting policies and rules about how the duties and powers should be performed as described in paragraphs 1, 2, 3, 4 and 5.
8. Ensuring the quality of the organisation of exams and final assessments.
9. When establishing guidelines and instructions as specified in paragraph 2, protocols are used for assessing (final) projects that meet national requirements as far as possible.
10. Appointing examiners and head examiners to administer exams and integrated exams and to determine the results of those exams. The board of examiners sets guidelines about appointing and assigning tasks to examiners for each exam format.
11. Terminating the appointment of examiners.
12. Making proposals to the Executive Board to end the enrolment of a student at serious fraud.
13. Advising the Executive Board on the discontinuation of a student's enrollment in a degree course as a consequence of the student's behavior in relation to future professional practice.
14. Deciding in the event of a suspicion that a student has committed irregularities and/or fraud and, if necessary, taking measures in that regard, in accordance with the regulations of the board of examiners as laid down by the board of examiners.
15. Deciding on a student's request to take a minor in accordance with the EER.
16. Deciding which HAN minors are approved as minors for the degree certificate. The overview of these HAN minors approved by the board of examiners can be consulted via the online environment of the board of examiners under overviews: <https://work.han.nl/sites/InstituutABC/examen/SitePages/Introductiepagina.aspx> and on #OnderwijsOnline under the tile 'ITBC minors'.
17. Deciding on a student's request for an extra opportunity to take an exam or modular exam.

18. Deciding on student requests to take an exam for a unit of study independently of the standard programme.
19. Deciding on a student's request to take exams and modular exams for the final bachelor assessment before they have passed the final propaedeutic assessment.
20. Deciding on a student's request to take units and complete exams and modular exams contrary to the applicable entry requirements.
21. Deciding on a student's request to take exams and modular exams in a different format from what is stipulated in the education and examination regulations.
22. Deciding on a student request, based on a functional disability or chronic illness or other condition such as pregnancy, to take exams and modular exams in an adapted format.
23. Deciding on a student's requests for an oral exam to be closed to the public. The board of examiners may also decide (in principle) to close certain exams to the public without the student's request in cases where there are special reasons such as company confidentiality during a graduation meeting.
24. Issuing documentation, module certificates and declarations.
25. Contributing to the formulation of the exam and examination policy for the degree programme or group of degree programmes.
26. Advising the dean on the education and examination regulations.
27. Awarding a certificate as proof of passing a final assessment once the Executive Board has declared that the procedural requirements for issue have been met.
The requirements for receiving a degree are that:
 - a) the student is enrolled at HAN University of Applied Sciences;
 - b) the tuition fees have been paid;
28. Deciding whether or not to grant student requests for postponement of certification.
29. Issuing a statement of successfully completed exams, at the request of a student, in cases where the student has successfully completed more than one exam and to whom a certificate as referred to in article 7.11 paragraph 2 of the Act cannot be issued.

Article 2.3 Board of examiners meetings

1. The board of examiners shall meet at least 10 times a year.
2. The meetings of the board of examiners are scheduled in such a way that they concur with the scheduling cycles of the degree course(s) and the school.
3. The board of examiners decides by a simple majority of votes.
4. If the votes are equally divided, the chair has the deciding vote.
5. At each meeting, the board of examiners ratifies decisions taken in the intervening period by the daily committee based on its general mandate regarding day-to-day affairs, as well as any other decisions taken based on delegated duties/powers.
6. The official secretary to the board of examiners ensures that a report is drawn up of every meeting. The report is adopted at the next meeting. The report includes a list of decisions made during the meeting.
7. The official secretary to the board of examiners ensures that the dean and any other members of the board of examiners receive a copy of the final report as soon as possible.
8. The official secretary to the board of examiners ensures that the final, anonymized reports of the meetings can be viewed digitally by lecturers/students/professors and others from the degree course concerned.

Article 2.4 Joint meeting of the dean and board of examiners

1. The board of examiners meets with the schoolmanagement at least 4 times per academic year.

Section 3: Quality assurance of exams, final assessments and organisation

Article 3.1 Ensuring the quality of exams

1. The board of examiners is responsible for ensuring the quality of exams.
2. The board of examiners will check if the guidelines and instructions as referred to in Article 3.2 are observed in practice and result in high-quality exams.
3. The board of examiners offers suggestions for improvements where needed.
4. Each year, the board of examiners prepares a monitoring plan / quality control plan to ensure the validity, reliability, feasibility and transparency of exams. This plan can be consulted via the annual report of the board of examiners.

Article 3.2 Guidelines and instruction for exams

1. Exams and modular exams are administered and graded by examiners and head examiners appointed by the board of examiners.
2. The examiners and head examiners examine and assess the exams and modular exams based on the criteria listed in the EERs and the guidelines and instructions adopted by the board of examiners.
3. The board of examiners adopts guidelines and instructions regarding:
 - the construction of exams; These can be consulted via the online environment of the board of examiners under the rules for decisions and points of attention: <https://work.han.nl/sites/InstituutABC/examen/SitePages/Introductiepagina.aspx>
 - the administering of exams; These can be consulted via the online environment of the board of examiners under the rules of decisions and points of attention, via the testing policy plan and via the educational descriptions in the EER of this study programme charter.
 - Extension of the examination time is not permitted for practical tests. The speed of action is part of the assessment.
 - the assessment and adoption of the result of exams. These can be consulted via Article 3.3 of these regulations, the online environment of the board of examiners under the rules of decisions and points of attention, via the testing policy plan and via the educational descriptions in the EER of this study programme charter.

Article 3.3 Ensuring the quality of final assessments

1. The board of examiners is responsible for ensuring the quality of the final assessments. They adopt and follow a policy for this.
2. The board of examiners regularly inspects whether the entirety of exams test all of the intended exit qualifications.
3. The board of examiners determines whether a student has the knowledge, understanding, skills and (if relevant) attitude, as described in the EER, required for obtaining a degree. The board of examiners will also determine whether a judgement is awarded. To this end, the board of examiners uses a (graduation) protocol that can be

consulted via the online environment of the board of examiners, subject to rules on decisions and points of attention.

4. The board of examiners is authorised to administer their own further investigation/exam to reach a careful decision about the matters outlined in the previous paragraph.
5. The board of examiners periodically reviews the quality of final graduation projects. The board of examiners may have these reviewed by other persons, who then submit a report to the board of examiners.
6. The board of examiners will prevent the undue awarding or withholding of study credits by examiners by:
 - The partial examination and the answer model are made and evaluated by 2 examiners or an assessment form belonging to the course unit description is used (Chapter 9 EER).
 - The test is assessed on the basis of the response model.
 - The Assessment Committee randomly tests modular exams with the corresponding answer model. When in doubt, the modular exam is assessed by the board of examiners.
 - The assessment of a modular exams and the establishment of the grade takes place according to the assessment criteria described in the course unit descriptions (Chapter 9 EER) by the indicated examiners.
 - The exam grade is calculated automatically by the formula according to the weighting as described in the assessment programme.

Article 3.4 Ensuring the quality of the organisation and procedures around exams and exams

1. The board of examiners is responsible for ensuring the quality of the organisation and procedures regarding exams and final assessments.
2. The board of examiners shall ensure compliance with the directives and guidance on the examinations as set out in article 3.2 paragraph 3. The board of examiners meets periodically with the exams office about this and if needed also with the school board.

Article 3.5 External validation of the quality of final assessments

The board of examiners ensures that the quality of the final assessment is validated by external parties by the following measures:

- degree programme and school-wide examination;
- implementing a joint protocol for assessing final graduation projects;
- hire of external experts to assist in preparing exams and assessment procedures;
- hires external experts to assess exam results;
- hire of external supervisors to monitor the quality of the assessment of final graduation projects (appendix 4);

Section 4: Appointment and expertise of examiners

Article 4.1 Appointing examiners and expertise of examiners

1. The board of examiners appoints (external) examiners to construct, administer, assess and grade exams. If there is more than one examiner for an exam or modular exam, the board of examiners also appoints a head examiner.
2. Depending on their role in the exam process, examiners and head examiners are experts in their subject field and possess the necessary knowledge and skills to prepare exams, set out methods and standards for assessing exams, organise examinations and analyse the results of exams based on guidelines and criteria for reliable, valid and transparent examinations and assessments. For examiners of written tests in the MMLS programme, the English Life Sciences variant of the Biology and Medical Laboratory Research programme, in the English Chemistry variant of the Chemistry programme or other written tests taken in English, they must at least have the Cambridge certificate C1 (CAE) or be proficient in English at an equivalent level. For the assessment of professional products and practical work is a minimal command of the English language required, equivalent to the Cambridge certificate B2.
3. The board of examiners promotes the adequate expertise of the examiners. If necessary, the board of examiners can ask the dean to take the necessary measures to facilitate the professional development of examiners.

As a way of ensuring the expertise of examiners and head examiners, the board of examiners has a profile they use when appointing examiners. The deployment list based on these profiles can be consulted via the Teams environment Jaartaak en Rooster ([Inzetlijst 2022-2023.xlsx](#) ([sharepoint.com](#)))

- Bachelor:
 - i Teachers can be appointed examiner of written tests and 1st examiner of graduation assignments if they have been employed for at least one year and have at least obtained the Basic Examination Qualification (BKE) or an equivalent programme. The 1st examiner of the graduation project must also have completed a relevant Master's programme.
 - ii Lecturers who have been employed for less for one year and / or (external) teachers who do not meet the profile for examiners may only under the supervision of an examiner who has pedagogical knowledge and skills drafting and reviewing written tests. In the joint assessment of written examinations, at least 50% of the lecturers who assess must have obtained their BKE.
 - iii Lecturers can be appointed as 1st examiner of the internship if they have been employed for at least 1 year and have completed a relevant Bachelor program. In the first year of employment, teachers can only be appointed as 2nd examiner of the internship.
 - iv Lecturers can be appointed as 2nd examiner of the graduation project if they have been employed for at least 1 year and have completed a relevant Master's programme.
- Master
 - i Lecturers can be appointed examiner when they have been employed for at least one year and have at least passed the Basic Qualification Exams (BKE) or an equivalent training. They must have at least a Master.
 - ii Lecturers can be appointed as 1st examiner of graduation assignments if they have been employed for at least one year and have obtained at least the Basic Qualification Exams (BKE) or equivalent training. The 1st examiner of the

- graduation project must also have completed a relevant Master's degree and have a PhD or equivalent experience in research and projectmanagement.
- iii Lecturers can be appointed as 2nd examiner of the graduation project if they have been employed for at least 1 year and have completed a relevant Master's degree.
 - iv Lecturers who have not yet been employed for one year and / or (external) lecturers who do not meet the profile for examiners may only prepare and assess tests under the supervision of an examiner who has educational knowledge and skills. When jointly assessing examinations, at least 50% of the lecturers who assess them must have passed their BKE.
4. Examiners are appointed for one or more specific programme components (unit of learning outcomes, unit of study, exam or modular exam, phase, specialisation) and for a specific period.
 5. The board of examiners informs examiners about their appointment and the profile description used.
 6. If necessary, examiners and other parties involved may be heard by the board of examiners and asked to provide the board with specific information and/or advice.
 7. If requested, examiners must be able to provide the board of examiners with materials for evaluating the quality of exams, assessment methods and assessment results (such as learning outcomes, test plans, test matrices, answer keys, assessment schemes, assessment criteria for assignments, the actual exams and/or assignments, the exam results and the analysis of the results).
 8. If an examiner does not meet – or no longer meets – the required level of expertise, the board of examiners is authorised to revoke that examiner's appointment.

Section 5: Further rules for decisions regarding individual students

Article 5.1 EER as model document

The EER contains model stipulations regarding exams, modular exams, minors, integrated exams, assessment criteria, exemptions, exams and modular exams taken independently of the standard programme, language proficiency, extended study load, study recommendations and studying with a functional disability, chronic illness or other special condition such as a pregnancy.

Article 5.2 Article 5.2 Further rules regarding exemptions from exams and modular exams

1. The procedure for requesting and granting exemptions for the bachelor degree programme is as follows:
 - The student must submit a written request for exemption from taking a (modular) exam/assessment or making a pathway independent (modular) exam/assessment- including the associated evidence - directly to the board of examiners.
 - The board of examiners may consult examiners or an external expert in order to come to a decision.
 - The board of examiners decides within 20 working days over the submitted request and informs and justifies this decision in writing to the student.

- If the exemption is granted or a learning pathway-independent exam is assessed as satisfactory or higher, the board of examiners ensures registration of the exemption or the assessment rating in the automated student information system.
2. The procedure for requesting and granting exemptions for the master degree programme is as follows:
- Please send your completed form Request for Exemption (found at the Onderwijsonline site of the degree programme) to Examencommissie.ATBC@han.nl. You will receive an e-mail confirmation that the request will be processed within 15 working days. The written decision will follow as soon as possible after this meeting. The procedure describe above for requesting an exemption from the board of examiners is the regular procedure.
 - There is another, shorter procedure. You submit your request for exemption to the programme of study, the programme of study will then contact the board of examiners. Contact your degree programme for more information; see also the information in this degree statute/EER about whether the student can be granted an exemption and based on which knowledge, skills and background.
 - If the exemption is granted or a learning pathway-independent exam is assessed as satisfactory or higher, the board of examiners ensures registration of the exemption or the assessment rating in the automated student information system.
3. Designation decisions which offer the prospect of exemptions for special target groups (e.g. as part of an abridged programme), can be found in Appendix 3.

Article 5.3 Further rules on studying with a functional disability, chronic illness or with some other special condition such as pregnancy.

1. If the student requires non-standard facilities relating to examination, the senior study advisor submits the request on behalf of the student to the board of examiners.
2. The study career coach or senior study career coach advises the board of examiners about the request and is responsible for the communication about the required measures. He/she also ensures that the measures are implemented in an effective manner and that the special facilities approved by the board of examiners are recorded in an agreement.

Article 5.4 Further rules regarding flexible minors

1. The board of examiners will request documentation from students for passed exams that were approved by the board of examiners for a flexible minor. This documentation may comprise a certificate, a statement or other documents showing the student passed the approved exam.
2. The documentation will be archived by the board of examiners.
3. After the board of examiners has received the documentation, the board will record the results of the exam or the exams for the flexible minor in the HAN student information system.
4. For a free minor of 30 credits consisting of non-foundation year subjects at university (WO) level, a fail mark (4.0 or higher) may be obtained for a maximum of 6 credits. The weighted average result of the examination results should be 5.5 or higher to complete the free minor successfully.

Article 5.5 Further rules for the Bachelor's examination

Students who want to pass the Bachelor exam register online via Insite. In addition, after the deadline, the board of examiners checks whether there are any other students who are eligible for the Bachelor's exam, but who have not registered. These students will also be discussed in the next exam meeting.

Article 5.6 Further rules regarding requests for an extra exam opportunity

Students can use the application form on #OnderwijsOnline - general information to request for an extra exam opportunity and / or another exam moment.

Section 6: Irregularity and fraud in (modular) examinations

Article 6.1 Definition of irregularities and fraud

1. An irregularity is defined as "any action or omission by an interested party in which they either intentionally or unintentionally give the wrong impression of their own or one or more other interested parties' knowledge, understanding, skills and attitude."
2. Fraud is defined as "any action or omission of which the interested party knew or should have known that this action or omission made it partly or wholly impossible to form a correct judgement of their or someone else's knowledge, understanding and (if relevant) attitude. And/or intentionally influencing (components of) the exam or exemption awarding process with the purpose of influencing the results of the exam or modular exam or decision about exemption or with the purpose of obtaining a different result for the exam or modular exam or request for exemption."
3. The following situations are in any case considered to be an irregularity or fraud:
 - a) intentionally or unintentionally submitting work in a portfolio and/or presenting or submitting work as a group's or an individual's own work (such as a thesis, project, assignment or other written piece for submission), while it was wholly or partly copied or created by the student in unauthorised collaboration with one or more other students; This also includes the following rules:
 - i paraphrasing the content of someone else's texts with insufficient references;
 - ii using or copying someone else's texts, data or ideas without providing the complete and correct references;
 - iii unclearly indicating in your text, for example without quotation marks or some other formatting, that the text has literally been copied from another author, even if you have provided the right references;
 - iv submitting text you have previously already submitted or that is comparable to what you have previously submitted for assignments or other exam components;
 - v submitting other types of written pieces acquired from a commercial institute or that have been written by someone else (whether or not for a fee);
 - vi not or barely contributing to a (group) assignment, but placing or having someone else place your name under the (group) work.
 - b) allowing exam questions and/or answers to be disclosed or obtaining knowledge of these during and/or before the exam sitting;

- c) aiding or assisting another student in a way that gives in an incorrect impression of that other student's knowledge, understanding and/or skills;
- d) seeking and/or receiving aid or assistance from a fellow student or other person in a way that gives an incorrect impression of the student's knowledge, understanding and/or skills;
- e) obtaining access to resources that are not permitted during an exam;
- f) using permitted resources during an exam that contain unauthorised notes and/or additions (e.g. margin notes or notes or additions on separate pieces of paper);
- g) leaving the exam room and returning to the room during an exam without explicit permission;
- h) leaving the exam room with the completed exam or part of it, also in cases when that answer sheet is subsequently handed in to the supervisor or their substitute;
- i) making changes to a completed exam already submitted to an examiner or a written exam or integrated exam already assessed by the examiner;
- j) sitting an exam under someone else's name, or having another person sit an exam for you;
- k) violating the rules that apply to reviewing and discussing marked exams;
- l) any other matters or incidents which the board of examiners sees as constituting an irregularity.

Article 6.2 Confiscation of evidence

In the event of a reasonable suspicion of an irregularity or fraud, the examination committee, (principal) examiner and those involved in the examination on behalf of the school board are authorised to confiscate any material that may serve as evidence of the irregularity or fraud. After the decision of the board of examiners as referred to in article 6.5 has become final and conclusive, the board will return the confiscated materials to the student.

Article 6.3 Measures taken in the event of fraud and irregularities

1. The board of examiners may impose one or more of the following measures if a student commits an irregularity or fraud during any part of an exam or modular exam:
 - a) giving a written warning;
 - b) giving a written reprimand;
 - c) invalidating an administered exam and the exam result if the board of examiners is unable to guarantee the quality of that exam due to the irregularity or fraud. If an exam is invalidated, this will lead to an exam result of 0;
 - d) withholding a student's degree certificate (if the irregularity or fraud is not discovered until after an exam has taken place);
 - e) deciding the degree certificate can only be awarded after the student has retaken an exam in a manner, on a date and at a time to be decided by the board of examiners (if the irregularity or fraud is not discovered until after the exam has taken place);
 - f) revoking the degree certificate after it has been issued (if the serious fraud was not discovered until after the certificate was issued to the student).
2. In the event of an irregularity or fraud, the board of examiners may deny a student access to one or more exams for a period not exceeding one year;

3. In the event of serious fraud, the board of examiners may recommend that the Executive Board terminate the student's enrollment for the degree course concerned.
4. If, in the opinion of the examination board, an examination taken does not meet the quality criteria for testing as a result of an irregularity or fraud committed by a person other than the student, the examination board may decide to declare (part of) the examination and/or the examination result invalid. Invalidating a past exam leads to the exam results being annulled or not being awarded. Students affected by this are offered the opportunity to redo the exam (or part of the exam) concerned.

Article 6.4. Hearing the student, the reporter of the irregularity and any third parties

1. The board of examiners will notify a student immediately, if possible orally but always in writing, of any reported irregularity or fraud involving that student at an exam.
2. The student will be given the opportunity to be heard by the board of examiners before a final decision is made.
3. If the student wishes to be heard, they need to make this known in writing within eight working days of the date on which he or she was notified of the opportunity to be heard.
4. The student must be heard no later than 10 working days after receipt of their request.
5. The board of examiners can hear the person who reported the irregularity and any third parties before making a final decision on the irregularity or fraud.
6. Before the hearing takes place, the student is informed of their right not to answer the questions posed by the board of examiners.
7. Any third parties brought along by the student may not be refused. They are permitted to be present as an observer.

Article 6.5 Announcement of decision

1. If the student does not respond in writing within 8 working days of being informed about the possibility to be heard, the board of examiners will presume that the student does not wish to be heard. After expiry of this period, the board of examiners will inform the student in writing of the decision or proposal/recommendation to the Executive Board within 10 working days.
2. If the student, reporter or any third parties are heard, the board of examiners will inform the student in writing within 10 working days after the hearing of the decision or of a proposal/recommendation to the Executive Board.

Section 7: Degree certificate and diploma supplement

Article 7.1 EER as model document

1. The EER stipulates model provisions with regard to units of learning outcomes / units of study¹, exams and degree certificates.
2. The board of examiners uses the formats for degree certificates, diploma supplements and other certificates adopted by the Executive Board and when awarding certificates ²follows the principles and procedures set out in the notes of that decision.

¹ This should be read as 'units of learning outcomes' for modules that are part of the experiment and 'units of study' for modules that are not yet included in the experiment or for the full-time degree format.

² Last adopted version: Executive Board decision 2019/1533. Always check if a more recent version has been adopted.

3. After the examination committee has determined that the bachelor or master examination has been passed, a student may submit a request to have his certificate handed over earlier than at the established moments. The board of examiners will grant this request, and the student needs to take into account a processing period of at least 10 working days.

Article 7.2 Translation of degree certificate

For translations, graduates can contact a certified translator at their own expense (see: <http://www.ngtv.nl>).

All costs for the translation are to be paid for by the student.

Section 8: Annual report of the board of examiners

Article 8.1 Annual report of the board of examiners and dean

1. Each year in November, the board of examiners writes a report on its activities during the previous academic year and sends this to the Executive Board and dean.
2. The board of examiners makes use of the guidelines for the annual report.
3. The relevant school manager receives a copy of the annual report.

Section 9: Final provisions

Article 9.1 Unforeseen circumstances

Matters not provided for by these regulations in which an immediate decision is needed will be decided on by the chair of the board of examiners, provided that doing so falls within the powers of the chair. The chair will communicate their decision to all interested parties as soon as possible.

Article 9.2 Complaints and appeals concerning decisions and procedures of a board of examiners

1. A student can submit an appeal to the Examination Appeals Board against a decision made by the board of examiners or an examiner within 6 weeks after this decision was announced. The procedure is outlined in the 'Regulations for Legal Protection of Decisions Concerning Education' in the HAN Student Charter.
2. Every decision taken by the board of examiners or individual examiner contains a remedy clause. This clause stipulates at least the following:
 - a. an appeal must be made within six weeks of the date of the decision;
 - b. an appeal can be lodged with the Examination Appeals Board;
 - c. The correct and current address details of the Examination Appeals Board;
 - d. a reference – for more information – to the 'Regulations for Legal Protection of Decisions Concerning Education' of the HAN Student Charter.
3. If a student wants to file a complaint against an examiner or member of the board of examiners, they can consult the procedure set out in the complaints regulations of the HAN Student Charter.

4. If a complaint or appeal concerns a member of the board of examiners, this member of the board of examiners does not take part in processing the complaint or appeal on behalf of the board of examiners.

Article 9.3 Adoption, effective date and amendments

1. These regulations were adopted by the ATBC board of examiners on 30 June 2022 and will take effect from 1 September 2022.
2. These regulations replace the Regulations of the SABC board of examiners that were adopted on 29 April 2021.
3. These regulations will be made available to the students and staff of the degree programme(s) as referred to in article 1.2 paragraph 3 of these regulations by inclusion in the Degree Statute.
4. Amendments to these regulations can be made by the board of examiners in the form of separate decisions. Amendments during the current academic year will be made only if this is necessary for the protection of students' interests.
5. Amendments to these regulations may not have any adverse impact on decisions that were made earlier by the board of examiners and were made based on these regulations.

Nijmegen, 30 June 2022



On behalf of the examination board C. H. Smit, chairman

Appendix 1: Duties delegated by the board of examiners

Overview of duties delegated by the board of examiners (by board of examiners – mandate giver – mandate decision(s) taken)

	Duties delegated by the board of examiners	Mandated body, or job title or specific duties of the mandated staff member,
1	approve or disapprove of a student to follow a Free Minor, i.e. a minor from another HBO institution or university	daily committee consisting of chairman and (vice-) secretary
2	contrary to the main rule, grant a student access to take examinations of the final examination before the propaedeutic examination has been passed successfully	
3	decides on handling of irregularities of modular exams/assessments.	
4	draw up an amicable settlement/rejection in the event of objections by students submitted to the Examination Appeals Board.	
5	decide on individual exemption requests of students;	
6	deciding on requests for special learning pathways and examinations that are independent of the learning pathway	
7	provide examiners with further guidelines and instructions on the assessment of the person taking the examination and on the determination of the results of the examinations	
8	decides to offer a student an extra (third) opportunity to take a modular exam/test;	
9	decide whether the student has access to an examination	
10	decides on the request of (senior) study coach (on behalf of student) regarding extra exam facilities (relating to taking part exams)	
11	decides on other special requests of students;	
12	establishing of overview of successfully completed exams	
13	to continuously monitor and promote the quality of examinations.	ATBC Assessment committee
14	continuously monitor and promote the competence of examiners.	
15	hear the student before a binding negative study advice is issued by the board of examiners. The hearing will be communicated to the board of examiners during the examination meeting of the foundation year phase when the study advice is adopted.	Study Coach.
16	giving permission for a student to follow a certified HAN minor. The list of approved HAN-minors can be found at #OnderwijsOnline under content - ATBC-minors.	

Note:

- The mandate will remain valid unless revoked by the board of examiners and as long as the mandated person remains employed by HAN and performs the duties specified above.

- Unless otherwise explicitly stated, those mandated are not authorised to further delegate these duties.

Nijmegen, 30-6-2022

A handwritten signature in blue ink, appearing to be 'C.H. Smit', written on a light blue background.

board of examiners C.H. Smit, chairman

Appendix 2: Duties delegated to the board of examiners by or on behalf of the Institutional Board

Overview of duties delegated to the board of examiners

	Duties delegated to the board of examiners
1	Granting the degree of Bachelor of Science of Master of Science
2	issuing the foundation year study advice. The exception to this is the binding negative study advice.
3	the declaration at the written request of a student and/or the management of a university masters course that the student is registered at the relevant Higher Vocational Education bachelor course and the expectation when this student will have taken the final examination of this course successfully.

Note:

- The mandate will remain valid unless revoked and as long as the mandated party remains employed by HAN and performs the duties specified above.
- Unless otherwise explicitly stated, those mandated are not authorised to further delegate these duties.

Appendix 3: For the right to specific exemption(s) for previously obtained (partial) examinations, certificates and other statements, diplomas and certificates

Decree on the abridged learning route MLO 2022-2023

For the academic year 2022-2023 is decided that students with an MLO diploma may participate in an abridged route. Students are not required to take the abridged route, and are free to choose for the regular 4-year degree programme.

The board of examiners shall grant students who participate in the shortened registration route access to one or more parts of the final examination, before they have successfully completed the foundation year examination of the selected programme of study.

As soon as students with an MLO degree enter the abridged programme, they are granted exemption for the examinations belonging to Basic practical skills Biology & Medical and Chemistry 1 (CHLS1B) and Basic practical skills Biology & Medical and Chemistry 2 (CHLS2B) and Basic theory Biology & Medical and Chemistry 1 (CHLS1C) and Basic theory Biology & Medical and Chemistry 2 (CHLS2C).

Students Life Sciences participating in the abridged route meet the requirements for the propaedeutic exam if they can demonstrate that CHLS1A and CHLS2A (Basic skills 1 and 2) have been completed and the professional tasks of Molecular Biological and Biochemical Research of DNA and Protein (professional competences, practice and theory, resp. LS3A, LS3B and LS3C) and Medical Diagnostics (professional competences, practice and theory, resp. LS4A, LS4B and LS4C), including the general higher professional education competences, have been mastered at level 1 by passing the exams belonging to:

- a. Molecular Biological and Biochemical Research of DNA and Protein (professional competences, practice and theory, respectively LS3A, LS3B and LS3C) and Medical Diagnostics (professional competences, practice and theory, respectively LS4A, LS4B and LS4C).
- or
- b. Professional Skills Level 2 Part 1 (LSA1) OR Part 2 (LSA2)
and
Practical Molecular and Biochemical Research (LS5B) OR Practical Interactions between Human, Plant and Micro-organism (LS6B)
and
Theory Molecular and Biochemical Research (LS5C) OR Theory Interactions between Human, Plant and Micro-organism (LS6C) from the second year of the Life Sciences programme (level 2).

After completing Professional Skills level 2 part 1 (LSA1) OR part 2 (LSA2) AND Theory Molecular and Biochemical Research (LS5C) OR Theory Interactions between human, plant and micro-organism (LS6C), exemption is given for Molecular Biological and Biochemical Research of DNA and Protein (professional competences and theory, resp. LS3A and LS3C) AND Medical Diagnostics (professional competences and theory, resp. LS4A and LS4C). After obtaining Practical Molecular and Biochemical Research (LS5B) OR Practical Interactions between humans, plants and micro-organisms (LS6B), exemption is given for Molecular Biological and Biochemical Research of DNA and Protein (practical, LS3B) AND Medical Diagnostics (practical, LS4B).

Students Chemistry participating in the abridged route meet the requirements for the propaedeutic exam if they can demonstrate that CHLS1A and CHLS2A (Basic skills 1 and 2) have been completed

and the professional tasks of Separation and Purification: Organic Chemistry and Polymer Chemistry (knowledge, practical and theme, resp. CH3K, CH3P and CH3T) and General Chemistry: Chemical Equilibria and Analytical Chemistry (knowledge, practical and theme, respectively CH4K, CH4P and CH4T), including the general higher professional education competences, have been mastered at level 1 by passing the exams belonging to:

- a. Separation and Purification: Organic Chemistry and Polymer Chemistry (knowledge, practical and theme, resp. CH3K, CH3P and CH3T) and General Chemistry: Chemical Equilibria and Analytical Chemistry (knowledge, practical and theme, respectively CH4K, CH4P and CH4T).

or

- b. Natural Product Synthesis: pheromones. Knowledge organic chemistry, reaction kinetics and spectrum interpretation (CH6K), Analytical chemistry: quality assurance and spectroscopy (CH5K), Chemistry Practical 2nd year 1 (CH5-7P; OR Chemistry Practical 2nd year 2 CH6-8P), Natural Product Synthesis project: Pheromones (CH6T; OR Biobased Polymers Project CH8T), Analytical Chemistry: quality assurance and spectroscopy (CH5T) and modular exam Professionalization 2 (CH8T-Prof) from the second year of the full-time course chemistry (level 2).
 - Natural Product Synthesis: pheromones. Knowledge organic chemistry, reaction kinetics and spectrum interpretation (CH6K) gives exemption for Separation and Purification: Organic Chemistry and Polymer Chemistry Knowledge (CH3K).
 - Analytical chemistry: quality assurance and spectroscopy (CH5K) exempts General Chemistry: Knowledge Chemical Equilibria and Analytical Chemistry Knowledge (CH4K).
 - Practical Chemistry 2nd year 1 (CH5-7P; OR Practical Chemistry 2nd year 2 CH6-8P) gives exemption for Separation and Purification: Organic Chemistry and Polymer Chemistry Practical (CH3P) AND General Chemistry: Chemical Equilibria and Analytical Chemistry (CH4P).
 - Natural Product Synthesis project: Pheromones (CH6T; OR Biobased Polymers Project CH8T) gives exemption for Separation and Purification: Project Organic Chemistry and Polymer Chemistry (CH3T).
 - Analytical Chemistry: quality assurance and spectroscopy (CH5T) and the higher professional education competence card gives exemption for General Chemistry: Project Chemical Equilibria and Analytical Chemistry (CH4T).

or

- c. Module A Instrumental Analysis (CDA, level 2), the general higher professional education competences level 1, and EVL BKCH of the part-time degree course Chemistry.

Basic practical skills Biology & Medical and Chemistry 1 and 2 (CHLS1B and CHLS2B) and Basic theory Biology & Medical and Chemistry 1 and 2 (CHLS1C and CHLS2C) are introductory courses in which basic theory and basic skills are discussed. This basic theory and skills have already been discussed at the MLO.

A comparison of the competencies of the foundation year phase (level 1) in the competency profile of the Chemistry programme or the Life Science/ Biology and Medical Laboratory Research programme shows that the competency development in semester 2 (course unit 3 and 4) is a continuation of the competency development in course unit 1 and 2, both in terms of knowledge and skills. In the document 'Relationship between competencies and modular examinations level I' that was made for both the Chemistry programme and the Life Science/ Biology and Medical Laboratory Research programme, it has been made clear that the competencies and corresponding indicators of level 1 that are tested in Basic practical skills Biology & Medical and Chemistry 1 and 2 (CHLS1B and CHLS2B) and Basic theory Biology & Medical and Chemistry 1 and 2 (CHLS1C and

CHLS2C) are also tested in semester 2 (course unit 3 and/or 4) of the Chemistry programme or the Life Science/Biology and Medical Laboratory Research programme.

A comparison of the competencies at level 1 and level 2 in the competency profile of the Chemistry programme and the Life Science/Biology and Medical Laboratory Research programme shows that the competency development in the second year (level 2) covers that of the first year (level 1). The documents 'Relationship between competencies and part examinations level I' and 'Relationship between competencies and part examinations level II', which were made for both the Chemistry programme and the Life Science/Biology and Medical Laboratory Research programme, show that all competencies with their corresponding indicators at level 1 and level 2 are tested in the part examinations of year 1 and year 2 respectively.

Based on this, the board of examiners has decided that for a student with an MLO diploma, if he can demonstrate that he has passed an examination for an course unit at a higher level (level 2), he has also demonstrated that he has mastered this examination for an course unit at a lower level (level 1).

This regulation for students with an MLO diploma has been drawn up because years of experience have shown that if these students meet the conditions (see above) it is quite possible to obtain the course units from the second year without first having done the course units from the first year, due to the extra knowledge and skills gained during their MLO training. If participation in the abridged route proves to be too difficult, it will be possible to return to the first year of study and to participate in semester 2 (course unit 3 and 4).

Nijmegen, 30-6-2022



C.H. Smit, Chair, board of examiners ATBC

Decree on the abridged learning route for VWO, HBO or WO 2021-2022

For the academic year 2022-2023, it is decided that students with a VWO diploma may participate in an abridged route. Students who have obtained credits from a related HBO or WO study programme may also participate in this abridged route. Students are not required to take the abridged route, and are free to choose for the regular 4-year degree programme.

The board of examiners shall grant students who participate in the shortened registration route access to one or more parts of the final examination, before they have successfully completed the foundation year examination of the selected programme of study.

As soon as students with a VWO diploma enter the abridged programme, they will receive an exemption for the modular exams Basic skills 1 and 2: lab calculation (CHLS1A-Lab and CHLS2A-Lab) for a qualification 7 or more for chemistry on the VWO diploma and an exemption for the modular exams Basic Skills 1 and 2: mathematics (CHLS1A-Wis and CHLS2A-Wis) for a qualification 7 or more for mathematics B on the VWO diploma. In the case of students with a HBO or WO study programme, the board of examiners will assess whether the examinations obtained with the related study programme lead to an exemption from the partial examinations for lab calculations and/or mathematics.

Students Life Sciences participating in the abridged route meet the requirements for the propaedeutic exam if they can demonstrate that CHLS1A and CHLS2A (Basic skills 1 and 2) have been completed and the professional tasks of Molecular Biological and Biochemical Research of DNA and Protein (professional competences, practice and theory, resp. LS3A, LS3B and LS3C) and Medical Diagnostics (professional competences, practice and theory, resp. LS4A, LS4B and LS4C), including the general higher professional education competences, have been mastered at level 1 by passing the exams belonging to:

a. Molecular Biological and Biochemical Research of DNA and Protein (professional competences, practice and theory, respectively LS3A, LS3B and LS3C) and Medical Diagnostics (professional competences, practice and theory, respectively LS4A, LS4B and LS4C).

or

b. Professional Skills Level 2 Part 1 (LSA1) OR Part 2 (LSA2)
and
Practical Molecular and Biochemical Research (LS5B) OR Practical Interactions between Human, Plant and Micro-organism (LS6B)
and
Theory Molecular and Biochemical Research (LS5C) OR Theory Interactions between Human, Plant and Micro-organism (LS6C) from the second year of the Life Sciences programme (level 2).

After completing Professional Skills level 2 part 1 (LSA1) OR part 2 (LSA2) AND Theory Molecular and Biochemical Research (LS5C) OR Theory Interactions between human, plant and micro-organism (LS6C), exemption is given for Molecular Biological and Biochemical Research of DNA and Protein (professional competences and theory, resp. LS3A and LS3C) AND Medical Diagnostics (professional competences and theory, resp. LS4A and LS4C). After obtaining Practical Molecular and Biochemical Research (LS5B) OR Practical Interactions between humans, plants and micro-organisms (LS6B), exemption is given for Molecular Biological and Biochemical Research of DNA and Protein (practical, LS3B) AND Medical Diagnostics (practical, LS4B).

Students Chemistry participating in the abridged route meet the requirements for the propaedeutic exam if they can demonstrate that CHLS1A and CHLS2A (Basic skills 1 and 2) have been completed and the professional tasks of Separation and Purification: Organic Chemistry and Polymer Chemistry

(knowledge, practical and theme, resp. CH3K, CH3P and CH3T) and General Chemistry: Chemical Equilibria and Analytical Chemistry (knowledge, practical and theme, respectively CH4K, CH4P and CH4T), including the general higher professional education competences, have been mastered at level 1 by passing the exams belonging to:

- a. Separation and Purification: Organic Chemistry and Polymer Chemistry (knowledge, practical and theme, resp. CH3K, CH3P and CH3T) and General Chemistry: Chemical Equilibria and Analytical Chemistry (knowledge, practical and theme, respectively CH4K, CH4P and CH4T).

or

- b. Natural Product Synthesis: pheromones. Knowledge organic chemistry, reaction kinetics and spectrum interpretation (CH6K), Analytical chemistry: quality assurance and spectroscopy (CH5K), Chemistry Practical 2nd year 1 (CH5-7P; OR Chemistry Practical 2nd year 2 CH6-8P), Natural Product Synthesis project: Pheromones (CH6T; OR Biobased Polymers Project CH8T), Analytical Chemistry: quality assurance and spectroscopy (CH5T) and modular exam Professionalization 2 (CH8T-Prof) from the second year of the full-time course chemistry (level 2).
 - Natural Product Synthesis: pheromones. Knowledge organic chemistry, reaction kinetics and spectrum interpretation (CH6K) gives exemption for Separation and Purification: Organic Chemistry and Polymer Chemistry Knowledge (CH3K).
 - Analytical chemistry: quality assurance and spectroscopy (CH5K) exempts General Chemistry: Knowledge Chemical Equilibria and Analytical Chemistry Knowledge (CH4K).
 - Practical Chemistry 2nd year 1 (CH5-7P; OR Practical Chemistry 2nd year 2 CH6-8P) gives exemption for Separation and Purification: Organic Chemistry and Polymer Chemistry Practical (CH3P) AND General Chemistry: Chemical Equilibria and Analytical Chemistry (CH4P).
 - Natural Product Synthesis project: Pheromones (CH6T; OR Biobased Polymers Project CH8T) gives exemption for Separation and Purification: Project Organic Chemistry and Polymer Chemistry (CH3T).
 - Analytical Chemistry: quality assurance and spectroscopy (CH5T) and the higher professional education competence card gives exemption for General Chemistry: Project Chemical Equilibria and Analytical Chemistry (CH4T).

or

- c. Module A Instrumental Analysis (CDA, level 2), the general higher professional education competences level 1, and EVL BKCH of the part-time degree course Chemistry.

A comparison of the subject matter of mathematics and lab calculations (Basic Skills, course unit 1A/1B) with the contents of the Mathematics B and Chemistry VWO 2015 exam programme shows that the exemption of the mathematics and labeling part examinations is justified.

A comparison of the competencies of the propaedeutic phase (level 1) in the competency profile of the Chemistry programme or the Life Science/Biology and Medical Laboratory Research programme shows that the competency development in semester 2 (course unit 3 and 4) is a continuation of the competency development in LS1B/LS1C and LS2B/LS2C, both in terms of knowledge and skills. In the document 'Relationship between competencies and modular examinations level I' that was made for both the Chemistry programme and the Life Science/ Biology and Medical Laboratory Research programme, it has been made clear that the competencies and corresponding indicators of level 1 that are tested in Basic practical skills Biology & Medical and Chemistry 1 and 2 (CHLS1B and CHLS2B) and Basic theory Biology & Medical and Chemistry 1 and 2 (CHLS1C and CHLS2C) are also tested in semester 2 (course unit 3 and/or 4) of the Chemistry programme or the Life Science/Biology and Medical Laboratory Research programme.

A comparison of the competencies at level 1 and level 2 in the competency profile of the Chemistry programme and the Life Science/Biology and Medical Laboratory Research programme shows that the competency development in the second year (level 2) covers that of the first year (level 1). The documents 'Relationship between competencies and part examinations level I' and 'Relationship between competencies and part examinations level II', which were made for both the Chemistry programme and the Life Science/Biology and Medical Laboratory Research programme, show that all competencies with their corresponding indicators at level 1 and level 2 are tested in the part examinations of year 1 and year 2 respectively.

On this basis, the board of examiners has decided that for a student with a VWO diploma, or examinations obtained at a related HBO or WO study programme, if he can prove that he has passed an examination belonging to an course unit at a higher level (level 2), he has also demonstrated that he has mastered this examination belonging to an course unit at a lower level (level 1).

This regulation for students with a VWO diploma has been drawn up because years of experience have shown that if these students meet the conditions (see above) it is quite possible to obtain the course units from the second year without first having done the course units from the first year, due to the extra knowledge and skills gained during their VWO study. If participation in the abridged route proves to be too difficult, it will be possible to return to the first year of study and to participate in semester 2 (course unit 3 and 4).

Nijmegen, 30-6-2022



C.H. Smit, Chair, board of examiners ATBC

Decree on the abridged learning route Bonn-Rhein-Sieg 2022-2023

For the academic year 2022-2023, it is decided that students who have completed the first two years of the three-year Bachelor's programme at the Hochschule Bonn-Rhein-Sieg may enter the third year of the Life Science variant of the Biology and Medical Laboratory Research programme, graduating in Biomedical Research with a compensation programme for HBO competencies (level 2). They are also given the opportunity to complete the internship (course unit LS11) by means of an independent examination.

The compensation program consists of following the workshops Professional skills where Conversation and feedback skills and Conflict management are discussed and the workshop Applying for internships / jobs. During the study coaching programme the students are guided in writing a POP and reflection reports. If a student has already arranged an internship during his study at BRS, an exemption can be requested from the board of examiners for the Applying for internships/jobs workshop.

The compensation programme is sufficiently completed if the student

- has 2 sufficient assessments during tutor for chairman including agenda (Professional skills level 2 part 1 and 2, LSA1-IPV and LSA2-IPV).
- has 2 sufficient assessments for minutes (Professional skills level 2 part 1 and 2, LSA1-IPV and LSA2-IPV).
- has written 2 PDPs, one at the beginning and one at the end of the first semester.
- has 2 performance interviews (Professional skills level 2 part 1 and 2, LSA1-FG1, LSA2-FG2 or LSA1-FG1, LSA2-FG2) and completed them with a reflection report.
- Has sufficiently completed the workshops Professional skills 1, 2 and 3 (LPO-PS1, LPO-PS2, LPO-PS3) and Applying for internships/jobs and discussed these during the performance appraisals (LSA1-FG1 and LSA2-FG2).

The document 'Argumentation Double Degree LS - Applied Biology H BRS_revised January 2019' compares the competence development and knowledge development of the regular Life Science students and the double degree students of Hochschule Bonn-Rhein-Sieg.

Only the 2nd year of the Life Science/Biology and Medical Laboratory Research programme programme was compared because a comparison of the competences at levels 1 and 2 in the competence profile of the programme shows that the competence development in the second year (level 2) covers that of the first year (level 1). In the documents 'Relationship between competencies and part examinations level I' and 'Relationship between competencies and part examinations level II', which were made for the Life Science/Biology and Medical Laboratory Research programme, it has been made clear that all competencies with their corresponding indicators at levels 1 and 2 are tested in the part examinations of year 1 and year 2 respectively.

On the basis of the above, the board of examiners has decided to grant these students exemption from the propaedeutic exam, Molecular and biochemical research practical and theory (LS5B and LS5C), Interaction between human plant and micro-organism practical and theory (LS6B and LS6C) and the minor upon registration. After sufficient completion of the compensation programme, exemptions will be granted for the course units Professional Skills Level 2 Part 1 and (LSA1 and LSA2).

The aim of the internship and graduation project is to train students to work individually on a project in professional practice. Students learn to deal with a complex project and develop self-responsibility

for their work. In addition, the theoretical understanding of the experiments in the context of the project will be developed.

Students of Bonn-Rhein-Sieg have a deeper and broader theoretical knowledge than regular Life Science students. They are also well trained to think in a broader context in processes with a high biological complexity. This additional knowledge makes it easier for Bonn-Rhein-Sieg students than regular Life Science students to understand the theoretical background of experiments and place it in a broader context. They do not need the traineeship in order to be able to graduate after the completion of course unit BMLS10 and the graduation project (competence level 3).

On this basis, the board of examiners has decided that these students will be given the opportunity to complete the internship by means of a learning path independent examination. The examination takes place 6 weeks after the start of the internship, in which the student demonstrates that he meets the requirements of the internship according to the course unit LS11 test program. If the examination is assessed with an insufficient grade, the student will continue his internship and at the end of the internship will be assessed according to the regular assessment of the course unit LS11. For the graduation project (course unit LS12) a new workplace has to be found.

Nijmegen, 30-6-2022

A handwritten signature in blue ink, appearing to be 'C.H. Smit', is written over a light blue rectangular background.

C.H. Smit, Chair, board of examiners ATBC

Appendix 4: Regulations for External Supervisors or Exams

POSITION AND APPOINTMENT OF EXTERNAL SUPERVISORS

- 1.1 The examination board appoints one or more external experts (hereafter called 'external supervisors') for each of the degree courses within the school, as defined in article 3.5 of the examination board regulations. These experts are responsible for monitoring the quality of the final assessment for the Bachelor or Master degree course (hereafter called 'the final assessment').
- 1.2 An external supervisor is not a member of the Examination Board for the relevant degree course and does not work as a lecturer or examiner for the course department where he/she acts as an external supervisor.

2. DUTY OF EXTERNAL SUPERVISOR AND RELATED DUTIES OF THE SCHOOL MANAGEMENT

- 2.1 An external supervisor is responsible for judging the quality of the graduation project and reporting on this in writing to the examination board via the Quality Assurance Committee. The evaluation by the external supervisor concerns the following in particular³:

A.	<i>The quality of exams and assessment</i>	Important aspects ²⁴ : - validity (a), - reliability (b), - quality assurance and monitoring (c), - professional expertise of examiners (d).
	The external supervisor selects from the six core questions listed in Appendix 1 with regard to aspects a to c.	
B.	the quality of students (realization of the intended exit qualifications)	Important aspects: - competency level, - integration of theory and practice, - vision of professional practice, - suitability as an entry-level professional.
C.	<i>The organisational quality of the final assessment</i>	Important aspects: - applying relevant rules and provisions, - organisation of the final assessment, - providing information to students.

The external supervisor has no task as examiner of the products of the graduation project.

³See also annex 2 ("quality objectives of the BA – exam) 24 for more details on the first three aspects (a -c) see annex 1.

- 2.2 Relevant documents are made available to the external supervisor in a timely fashion – and if necessary explained further – by or on behalf of the examination board.
- 2.3 The external supervisor, in consultation with the dean, prepares a screening programme to evaluate the quality of the final assessment.
- 2.4 The dean ensures that the secretary of the relevant Examination Board is informed in a timely fashion and in writing of the name(s) of the external supervisor(s) and the screening programme.
- 2.5 The examination board and the Internship Bureau from the relevant Degree assists the external supervisor in carrying out his/her duties. This involves providing the opportunity for the external supervisor to:
 - inspect, in a timely fashion, a representative sample of the final assessment/exam assignments and products, as well as their assessment;
 - provide opportunity to attend one or more exams/final assessments;
 - attend one or more meetings of the Examination Board.
- 2.6 Before November, the quality control committee sends a concise, written report based on the findings of the external supervisor on the final assessments of the *preceding academic* year to the examination board. If necessary, this report also gives suggestions for improving the quality of the assessments.
- 2.7 If needed, the external supervisor may also use appendix 2 with 11 with statements to prepare his or her report.
- 2.8 The examination board discusses the report referred to in 2.6 with the internship bureau and if applicable with the external supervisors. The examination board sends a report of this meeting to the external supervisors. The reporting of the quality control committee is attached to this report.

3. COMPETENCE PROFILE OF THE EXTERNAL SUPERVISOR

- 3.1 Knowledge:
 - Is familiar with the current theory and practice of the professional fields relevant to the degree course.
 - Is familiar with the exit qualifications for the relevant degree programme.
 - Is familiar with the examination and assessment systems and the teaching methods used at Universities of Applied Sciences.
- 3.2 Skills:
 - Capable of working/interacting in such a way that both students and examiners feel they are communicating with an expert in their field.
 - Capable of assessing assignments and products for exams and final assessments in terms of relevance and consistency.
 - Capable of evaluating research from a perspective – and relevant to – the professional field in question.
 - Capable of giving a well-founded judgement on the content of the final assessment, as well as the knowledge, understanding, skills and attitudes (competences) of the student and can clearly justify his judgment.
 - Examiners may be assessed in terms of their method(s) of examining and assessing.

3.3 Attitude:

- Capable of empathising with students participating in a final assessment/exam interview.
- Confident and capable of giving examiners and/or students constructive feedback.

3.4 Other conditions:

- Bachelor: Works at minimally HBO/Bachelor level or higher and holds a Master's degree. Master: Works at master level and hold a PhD.
- Several years of work experience in a profession relevant to the degree programme.
- Independent from the student and his graduation project.
- Willing and able to attend (a representative number of) exams/final assessments and meetings of the Examination Board.

4. FEES

The external examiner receives the standard financial compensation customary at the HAN. The dean ensures that the external supervisor is provided with expense claim forms for attendance fees and travel and accommodation costs. Payment of compensation is made by or on behalf of HAN.

5. ADOPTION AND EFFECTIVE DATE

These regulations were adopted on 30 June 2022 by the examination board School of Applied Biosciences and Chemistry and shall enter into force on 1 September 2022.

Appendix 1: Additional details on the quality of examinations and assessments (aspects a-c)

The Accreditation Organisation of the Netherlands and Flanders (NVAO) applies the following criterion, amongst others, for evaluating a degree course. This criterion is a 'knockout' factor.

'The degree course has an effective system of examination and clearly shows that the intended exit qualifications are achieved'.

The key elements of an appropriate key and assessment system are summarized in the overview below.

Keyword: Validity	
Core questions	1. Does the degree course measure what it intends to measure? 2. What benchmark/cut-off points does the degree course use?
Intended results	<ul style="list-style-type: none"> - Learning outcomes (e.g. competences), operationalized at the exit and intermediate levels, are set out clearly⁴ (e.g. by indicators) in such a way (e.g. in a schematic overview) that they are clear to all internal and external parties. - Assessment criteria and the standard (cut-off) per modular and final exam/assessment have been set out in a clear and transparent manner (i.e. with a recognizable link to the exit qualifications at the relevant level of proficiency).
Keyword: Reliability	
Core questions	3. Are all the assessors in agreement with one another? 4. How was this consensus reached (systematically or by chance)? 5. Are the considerations made to reach an agreement set out in a clear and transparent manner?
Intended results	<ul style="list-style-type: none"> - Systematic consultation should take place between assessors to reach agreement about procedures for administering and assessing examinations, the (interpretation of) assessment criteria and standards (i.e. cut-off points), and the assessment/feedback that will be given to students. - The organisational structure allows for systematic synchronization between internal and external assessors about procedures for exams, the (interpretation of) assessment criteria and standard (cut-off), and the feedback that must be given. - The considerations/arguments on the basis of which the judgement was reached are to be set out clearly after assessment (e.g. specified on assessment or feedback forms).
Keyword: quality and assurance	
Core questions	6. How is the quality of examination and assessment assured and monitored?
Intended results	<ul style="list-style-type: none"> - The procedures for examining and assessing the exit qualifications (per level of proficiency) have been set out clearly (i.e. without cause for discussion between assessors). - Procedures for the development of examination and assessment are set out in a clear and transparent manner. - A structure that aims systematically (i.e. now and in the future) to increase consensus between assessors is outlined (plan), carried out in this way (do), and works (check, act). - The role and responsibilities of the Examination Board (and any other parties involved) in safeguarding and monitoring the quality of examinations and assessment are set out in a clear and transparent manner. - Competency requirements of internal and external examiners, supervisors and exam developers, and how to monitor and manage this (e.g. professional development, peer review), are set out in a clear and transparent manner.

⁴Set out clearly = reached in agreement, recorded (described in course documentation) and communicated

4 Regulations of the Degree Committee

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Regulations of the Degree Committee for the degree committee of the Master of Molecular Life Science

Section 1 Introductory provisions

Article 1 Status and definitions

1. These regulations are regulations as defined in the HAN administrative and management regulations of the HAN University of Applied Sciences.
2. These regulations are applicable to the degree committee of the Master of Molecular Life Science degree course
3. The definitions and provisions from the glossary in Appendix 1 to the degree statute are applicable to these regulations.

Section 2 Degree Committee

Article 2 Establishing degree committee(s)

1. A degree committee will be established for each degree course or group of degree courses.
2. If a faculty comprises only one degree course, the duties and powers of the degree committee will be exercised by the sub-council.
3. If a degree committee is established for two or more degree courses, that degree committee will be referred to as a joint degree committee. The decision to establish or dissolve a joint degree committee will be taken by the programme council, and it will require the consent of the institute council. The institute council will consult the relevant degree committees with regard to the decision whether or not to give its consent.
4. The provisions in these regulations also apply to joint degree committees, unless the nature of the provision precludes such application.
5. One or more divisions may be set up within a degree committee if required. A division can be set up as needed according to the degree format, according to a special feature of the degree course (e.g. English-taught), according to the location of the degree course or according to any other particulars of the degree course.
6. The degree committee for the degree course Master of Molecular Life Science has been established for one degree course.

Article 3 Joint Assembly

If the degree courses of an institute do not have a joint degree committee, all of the degree committees within that institute will convene in a joint session at least 2 times a year to discuss shared matters of concern, including at least those matters specified in article 27.4 of these regulations.

Article 4 Composition of the degree committee

1. The degree committee consists of 4 members.

2. Half of the members of the degree committee will consist of students from the relevant degree course, with the other half of the members of the degree committee consisting of staff members from the relevant degree course.

3. No individual belonging to the programme council or institute management, employed as an education manager or performing the duties of a course coordinator may simultaneously be a member of the degree committee.

Article 5 Appointment term

1. The members of a degree committee and members of the joint assembly appointed from among the student body serve for terms of two years. The members of a degree committee and members of the joint assembly appointed from among staff members serve for terms of four years.

2. The term begins on 1 September.

3. All members step down simultaneously at the end of their terms.

4. At the end of their terms, members of a degree committee and members of the joint assembly may be re-appointed, on the understanding that members appointed from among the staff may serve for two consecutive terms and may not be re-appointed again after those two terms until they have had a one-term break from serving on the committee. After stepping down, members appointed from among the student body may be re-appointed for a maximum of four consecutive academic years.

Article 6 Termination of membership

1. Membership in a degree committee and the joint assembly will end:

a. upon the expiration of the term, unless the member is re-appointed;

b. before the end of the term:

- in the event of death;

- in the event that the composition of the degree committee no longer meets the requirements specified in these regulations;

- in the event that the lecturer is no longer employed at the relevant institute or is no longer affiliated with the relevant degree course;

- in the event that the student member has quit the degree course.

2. A member of the degree committee may terminate the membership at any time by withdrawing the membership in writing, stating the reason, addressed to the institute management.

Article 7 Composition

1. The degree committee will be composed by nomination and appointment.
2. A review will be conducted each year to determine whether this method of composition is still appropriate.

Section 3 Elections

As the degree committee opts for nomination and appointment of the composition the provisions of section 3, described in article 8 up until article 15, do not apply.

Section 4 Appointment

Article 16 Appointment

The members of the degree committee are appointed by the institute management.

Article 17 Procedure

1. At the opening of the academic year, the members of the degree committee's student division will submit at least one student from each degree course (belonging to the group of degree courses) to the institute management for nomination, with due consideration of article 4. The submission will be compiled by the degree committee of the relevant degree course, or on behalf of the institute management.
2. Prior to the expiration of the term, the members of the degree committee's staff division will submit 2 staff members from each degree course (belonging to the group of degree courses) to the institute management for nomination for the coming term, with due consideration of article 4. The submission will be compiled by the degree committee of the relevant degree course(s), or on behalf of the institute management.

Article 18 Interim appointment

1. In the event of an interim vacancy on a degree committee the institute management will appoint a replacement member. The appointment procedure specified in article 17 will be followed.
2. The replacement member must be appointed within four weeks of the opening of the interim vacancy.
3. The interim replacement member will step down at the same time that the person being replaced would have stepped down.

Section 5 Positions and performance

Article 19 Positions

1. The degree committee will elect one of its members as chair and one as secretary, in addition to electing two members as deputies.
2. A degree committee will be represented by either the chair or the respective deputy.

Article 20 Decision-making

1. The degree committee will take decisions by a simple majority of votes. Abstentions will not be counted. Votes may be held only if a majority of the members are present at the meeting.
2. Voting will take place without the presence of the management or discussion partner.
3. The members of the degree committee will advise and vote independently and unbound by any instructions.
4. In the event of absence, the absent member may vote by proxy. Proxies must be submitted in writing at the beginning of the meeting. A member may cast only one proxy vote for another member at a time. The proxy will vote independently and unbound by any instructions. Proxies will be counted when determining the quorum for the meeting.
5. Anyone who is involved in performing the duties of the committee and who therefore has access to information that is known to be or could be reasonably expected to be of a confidential nature will be bound to confidentiality.
6. Where applicable, the degree committee will ensure that the viewpoints represented by the minority of the votes cast are also communicated to the programme council and/or the institute management.
7. The degree committee will ensure that its resolutions, recommendations and proposals are available for inspection in a place accessible to the lecturers and students of the relevant degree course or institute.

Article 21 Meetings

1. The degree committee will meet 4 times a year and also at any time at least half of the members of the degree committee request a meeting. Meetings will be scheduled by the course coordinator. *The chairman and one lecturer will partake in 2 joined meeting with joined OC from academieplein.*
2. The members of the degree committee will receive a written invitation to the meeting no later than five working days before the meeting. The invitation will be accompanied by an agenda.
3. The meeting documents will be sent to the members of the degree committee no later than four working days before the meeting. If the documents are sent later, the members may decide by majority of votes not to address the meeting documents.
4. The degree committee may request information from experts during the meeting. The secretary will be informed about the expert at least seven days before the meeting.
5. The degree committee may compose a temporary committee from among its members in order to prepare a topic. This committee will report to the degree committee.

Article 22 Public nature of meetings

1. The meetings of the degree committee will be public unless the degree committee decides otherwise. The degree committee will determine whether to hold a closed meeting in preparation for a public meeting. No resolutions may be passed in closed meetings.
2. The degree committee must hold at least two public meetings a year. The dates of the public meetings will be scheduled in consultation with the course coordinator and in a way that they concur with the official HAN academic calendar.

Article 23 Reporting procedure

1. The secretary of the degree committee will prepare a report of each meeting.
2. This report must contain at least:
 - the date, time and location of the meeting;
 - the names of the members who are present at and absent from the meeting;
 - the agenda items;
 - the main discussion points;
 - any explanations of votes;
 - the recommendations;
 - the resolutions concerning recommendations, noting any votes and results of votes;
3. A draft version of the report will be sent to the members of the degree committee no later than 15 working days after the meeting, after which the report will be confirmed in the next subsequent meeting.
4. The reports of the public meetings of the degree committee will be made available in digital format to the lecturers and students of the relevant degree course.

Article 24 Contact with management

1. The programme council, the institute management and the course coordinator of the relevant degree course will promptly and without request provide the degree committee with all information they might reasonably or justly need to fulfil their duties. Upon request, they will promptly provide the degree committee with all information the committee may reasonably or fairly deem necessary to fulfil its duties.
2. At least twice a year, the degree committee is authorised to invite the institute management to discuss the intended policy based on the agenda that it has prepared.
3. At the opening of the academic year, the degree committee will prepare a policy plan with its key policy points for the coming academic year. The policy plan will be shared with the institute management and, if necessary, with the programme council.
4. At the request of the institute management, its designated deputy or at the request of the degree committee, the institute management or its designated deputy will attend the meetings or parts of the meetings of the degree committee.
5. The institute management will be responsible for ensuring the students and staff of the relevant institute are sufficiently informed of the existence and performance of the degree committee.

Article 25 Annual reporting procedure

1. No later than November of each year, the chair of the degree committee will submit a written report to the institute management concerning the duties and performance of the degree committee during

the previous academic year. The chair will send the report to the programme council and institute council for inspection.

2. The report will contain information on at least the following points:

- the composition of the degree committee
- the degree committee's vision on its duties and procedures;
- the degree committee's policy plan and evaluation of its policy plan;
- the recommendations and resolutions issued by the degree committee, including requests for consent;
- the board's reaction to the recommendations and resolutions;
- conclusions and recommendations.

3. The written report referred to in paragraphs 1 and 2 must at any rate be made available digitally and, if requested, in hard-copy format to the staff and students of the institute or degree course(s) concerned.

Article 26 Contact with the institute council

The chair of the degree committee will ensure that consultation with the institute council (or its chair) is held as needed.

Section 6 Duties and powers of the degree committee

Article 27 Mission of the degree committee

1. The degree committee has the duty to advise on the promotion and safeguarding of the quality of the degree course.

2. The degree committee will also be charged with the following duties:

- annually assessing the operational methods of the education and examination regulations (EER) of the relevant degree course;
- advising or issuing proposals to the institute council, the programme council or the institute management on all other matters concerning education in the relevant degree course(s) when requested or upon its own initiative. The committee will send these recommendations and proposals to the institute council for inspection.

3. A division of the degree committee will be charged with advising the degree committee on the following:

- promoting and safeguarding the quality of the degree course;
- annually assessing the implementation methods of the EER of the relevant degree course;
- advising or issuing proposals to the degree committee on all other matters concerning education in the relevant degree course(s) when requested or upon its own initiative

4. The joint assembly has the following duties:

- discussing the separate recommendations on the EER from the degree committees belonging to an institute, in order to reach a joint resolution in the event that the EER is adopted at the institute level;
- discussing the separate assessments of the degree course(s) concerning the implementation of the EER in order to reach a resolution on the implementation of the EER at the institute level;
- advising the institute management, programme council and/or institute council on all other matters concerning education in the relevant degree course(s) at institute level when requested or upon its own initiative.

Article 28 Right of consent

1. The degree committee has right of consent concerning the administrative and management regulations in so far as:

- they specify a manner of composition other than election for the degree committee;
- they concern the annual assessment of the appropriateness of this other method of composition;

2. The degree committee has right of consent concerning the EER of the relevant degree course in so far as they concern:

- the manner in which education is evaluated within the relevant degree course;
- the content of the graduation specialisations within a degree course;
- the quality of the knowledge, insight and skills that students should have acquired upon completion of the degree course;
- the organisation of practical exercises, as needed;
- the study load of the degree course and each of its units of study;
- if applicable, the selection procedure of students for special programmes within a degree course aimed at helping students attain a higher level of knowledge;

Article 29 Right to prior consultation

The degree committee has a right to prior consultation concerning the EER of the relevant degree course in so far as it concerns:

- the content of the degree course and the exams associated with it;
- any further rules on issuing study recommendations for the propaedeutic phase and further rules on issuing referrals in the propaedeutic phase if a degree course includes more than a graduation specialisation after the propaedeutic phase;
- the number and order of exams, as well as the times at which they may be administered;
- the full-time, part-time or work-study structure of the degree course;
- where necessary, the order in which, time frame within which and number of times each academic year that students are to be offered the opportunity to take exams and final assessments;
- where necessary, the extension of the validity term of passed exams, subject to the authority of the

board of examiners;

- the method used to administer exams, whether orally, in writing or otherwise, subject to the authority of the board of examiners to decide on a different method in special cases;
- the manner in which students with disabilities or chronic illnesses are to be given the opportunity to take the exams;
- the public character of exams that are to be administered orally, subject to the authority of the board of examiners to decide differently in special cases;
- the time frame within which the results of an exam are to be posted, along with circumstances under which exceptions may be made to this time frame;
- the manner and term in which individuals who have taken a written exam will be allowed to review their work after it has been assessed;
- the manner and term in which questions and assignments made or given as part of a written exam may be reviewed, as well as the standards according to which the assessment was performed;
- the grounds upon which the board of examiners may grant exemptions for one or more exams based on previously passed exams or final assessments in higher education or based on knowledge and skills acquired outside the context of higher education;
- where necessary, the requirement to pass certain exams before admission will be granted to take other exams;
- where necessary, the requirement to participate in practical exercises for the purposes of admission to taking the relevant exam, subject to the authority of the board of examiners to grant exemptions from this requirement, whether or not that is conditional upon alternative requirements;
- the monitoring of study progress and individual personal tutoring;
- the actual design of the education.

Article 30 Conditions for consent and consultation

1. The programme council and/or the institute management will ensure that:
 - a. recommendations are requested at such a time that it can actually bear an influence on the decision-making;
 - b. the committee has the opportunity to consult with the relevant board before the recommendation is issued;
 - c. the committee is notified in writing as quickly as possible concerning the manner in which the recommendations will be acted upon.

Article 31 Procedure for consent and consultation

1. The degree committee will notify the programme council and/or the institute management in writing about whether the degree committee has granted consent or what the degree committee's recommendation is as soon as possible, but no later than six weeks after consent or consultation has been requested.

2. The degree committee and the institute management may agree to extend the term specified in the preceding paragraph, or to shorten it due to the urgency of the decision to be taken, or may agree whether the decision to be taken is required in order to comply with a legal prescription.

3. If the degree committee has not notified the programme council and/or the institute management of its recommendation or decision concerning the requested consent within the term referred to in the first paragraph of this article, or within the extended or shortened term, the degree committee will be regarded as not having exercised its powers.

4. The degree committee may consult with students and/or staff members from the relevant degree course prior to taking a decision on a request for consent or before issuing a recommendation.

Article 32 Deviating from a recommendation

1. If the programme council and/or the institute management does not wish to follow all or part of a recommendation from the degree committee, it will notify the degree committee of this, along with its reasons, within four weeks. The programme council and/or the institute management will ensure that the degree committee has the opportunity to engage in further consultation with the relevant board before taking a definite decision.

3. The programme council and/or the institute management will suspend the execution of its decision for four weeks after the day on which the degree committee announced its decision, unless the committee has no objection to the immediate execution of the decision.

4. The programme council and/or the institute management will notify the degree committee, the institute council and, in the case of a decision by the institute management, the programme council in writing of the definite decision, noting that the decision deviates from the degree committee's recommendation.

Article 33 Right of initiative

1. If the degree committee makes a proposal as referred to in article 27.2 of these regulations, upon request or at its own initiative, to the institute council, the programme council or the institute management, the institute management and/or the programme council will respond to the proposal within two months of receipt. The degree committee will send these recommendations and proposals to the Participation Council or the relevant institute council for inspection.

Section 7 Quality assurance

Article 34 Quality assurance

1. At the opening of the academic year, the degree committee and the course coordinator will make agreements concerning the manner in which the quality assurance is performed.

2. At the closure of a module, the students of the respective module will be offered an anonymous questionnaire digitally regarding the lectures, assignments and relevant staff member of the respective module.

- 3. At the closure of a module, a personal session will be offered with a staff member of the degree course and the class of the respective module to give feedback and evaluate the module that is (about to be) closed.*
- 4. After each graduation session, the graduate, his/her workplace advisor and the external advisor involved in the graduation session are asked to give their opinion about the graduate's qualifications and the course of the graduation (session) by filling in a questionnaire.*
- 5. The core team members have regular discussions (2 per year) with the Professional field advisory board and with other representatives of the field to align the programme with needs in the professional field.*
- 6. Alumni are invited to participate in the alumni network to give their input on the programme's quality and effects for them. In this network they are asked for their opinion on certain changes to the program.*
- 7. The programme is audited by education and work field experts every 6 years in the course the accreditation by the NVAO. In addition, a mid-term HAN-internal audit takes place in which the programme receives feedback on its quality based on the NVAO quality standards.*
- 8. The degree committee is involved in quality assurance by giving feedback and approving the annual Degree Statute/Education and examination regulations, and by giving feedback on various aspects (requested and on own initiative) throughout the year.*
- 9. The core team discusses incoming feedback, involving other stakeholders if required, and decides on improvement actions. The core team also safeguards the realisation of improvement actions.*
- 10. An annual report on the programme quality and planned improvement actions is written by the programme team.*

Article 35 Involvement in accreditation

Within the context and for purposes of the accreditation of the degree course:

- the degree committee will provide a recommendation for the self-evaluation of the degree course upon request from the institute management or programme council;
- in certain cases the degree committee will have the right to prior consultation with regard to the recovery plan.

Section 8 Disputes

Article 36 Access to the Disputes Advisory Committee

The disputes committee for participation will inspect disputes between the degree committee, the programme council or the institute management with regard to:

- a. the application of the regulations of the degree committee;
- b. disputes arising from articles 27 to 30 of these regulations.

Article 37 Amicable settlement

In the event of a dispute between the degree committee and the institute management and/or the programme council, the Executive Board will investigate the possibility of amicable settlement. If this is not possible, the institute management, the programme council or the degree committee will submit the dispute to the Disputes Advisory Committee.

Article 38 Binding judgement of the Disputes Advisory Committee

The disputes committee is authorised to effect an amicable settlement between parties. If no amicable settlement is possible, the disputes committee will resolve the dispute by issuing a binding judgement, testing whether:

- a. the programme council and/or the institute management has adhered to the requirements of the law and the internal regulations for degree committees;
- b. the programme council and/or the institute management could have reasonably arrived at the proposal or decision in the consideration of the interests involved;
- c. the programme council and/or the institute management has acted negligently with regard to the degree committee.

Article 39 Suspended execution of a decision

If the dispute concerns the choice whether or not to follow the recommendation or not to follow part of the recommendation given by the degree committee, the execution of that decision will be suspended for four weeks, unless the degree committee has no objection to the immediate execution of the decision.

Article 40 Permission in the absence of consent

If the programme council and/or the institute management has not received consent from the degree committee for its intended decision, the programme council and/or the institute management may request permission from the disputes committee to take the decision, contrary to the provisions of article 31. The disputes committee will grant permission only if the decision of the degree committee not to provide consent is unreasonable or if compelling organisational, economic or social reasons call for the intended decision of the programme council and/or the institute management.

Section 9 Facilities

Article 41 Facilities for degree committees (and their members)

1. The programme council and the institute management will grant to the degree committee the use of the facilities to which the committee may have access and that the committee could reasonably need to fulfil its duties, including in any case administrative, financial and legal support.

2. More specifically, the degree committee is entitled to:

- meeting space.
- facilities for the reproduction/distribution of meeting documents.
- secretarial support.
- company catering, food services.

The programme council and the institute management will allocate a training budget to the members of the degree committee. The training budget will be determined at the opening of the academic year, in joint consultation between the degree committee and the institute management and, in any case, it will allow the members of the degree committee to participate in the training and professional development opportunities offered by HAN Academy. The training budget for the degree committee of the Master of Molecular Life Science degree course amounts to 2,000 euro. per academic year .

4. The members of the degree committee who are employed as staff members will have the opportunity to participate in this training during working hours and with retention of salary.

5. The programme council and the institute management will allow the degree committees the opportunity to meet during working hours whenever possible. Each student and staff member of the degree committee will be facilitated for all degree committee activities for 15 hours each academic year, with the position of chair and minute taker receiving additional facilitation of 30 hours each academic year.

Section 10 Final provisions

Article 42 Legal protection

The Executive Board, the programme council, the institute management and the course coordinator of the Master of Molecular Life Science degree course will ensure that the members of the degree committee and the members of the joint assembly are not disadvantaged in their position and/or interests in relation to the institution on account of their membership in the degree committee.

Article 43 Unforeseen circumstances

Matters that are not provided for in these regulations and for which an immediate decision is needed by the degree committee will be decided upon by the chair of the degree committee or the chair of the joint assembly. The chair must communicate this decision as soon as possible to the other members of the degree committee, as well as to the institute management, the relevant course coordinator(s) and the programme council.

Article 44 Effective date

These regulations were adopted by the programme council on 25 May 2020 and came into effect on 1 September 2020.

Appendix to chapter 6 description of the education

Master Molecular Life Sciences 2022-2023

Details of the units of study

In accordance with article 4. 1 paragraph 1 of the Education and Examination Regulations

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Fundamentals Module

Title of UOS	Fundamentals HMP-MMLS-FUND
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences
Title of UOS	Fundamentals
Name UOS Alluris	HMP-MMLS-FUND
Code OSIRIS	
Code Alluris	HMP-MMLS-FUND
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
(Professional) Products	<ul style="list-style-type: none"> Assignments to apply the Body of Knowledge and Skills and to train fundamental research skills
Credits/ study load	7 EC / 196 study load hours, consisting of 50 contact hours and 146 hours for self-study and work on assignments
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> none
General description	<p>The unit of study Fundamentals aims at refreshing and extending the knowledge and skills of a bachelor in bio-molecular research & development. Subjects include molecular biology, cell biology, biochemistry, statistics and the basics of bioinformatics. Special focus is on the techniques used in the field. Reading, understanding and critically analysing scientific articles are subject of the unit of study as well.</p> <p>2-weekly assignments on various subject areas will support students in (re)acquiring the knowledge and skills and in becoming familiar with the education programme.</p> <p>At the end of the module, all students have the fundamental knowledge and skills at post-Bachelor level that help them to subsequently acquire the knowledge, skills and competences characteristic for this master in the following units of study.</p>
Competences	Competence 3: Design, analysis and control of experiments
Assessment criteria/ Exams	See exams of the UOS Introduction below this table
Compulsory literature	<ul style="list-style-type: none"> Reader Fundamentals Original research articles are provided with the weekly assignments
Recommended literature	<ul style="list-style-type: none"> Alberts, Johnson, Lewis, Morgan, Raff, Roberts, and Walter, (2015 or 2017). <i>Molecular Biology of the Cell</i>. (6th or 7th edition). Garland Science:

	<ul style="list-style-type: none"> ❖ Reed, Weyers & Jones (2016): <i>Practical Skills in Biomolecular Science</i>. Pearson ❖ Berg, J.M., Tymoczko, G. Gatto J., Stryer, L. (2015 or 2019). <i>Biochemistry</i>. (8th or 9th edition). W.H. Freeman. ❖ Samuel, M.L., Witter, J.A., & Schaffner, A. (2011 or 2015). <i>Statistics for the Life Sciences</i>. (4th or 5th edition). Pearson. ❖ Pevsner, J. (2015) <i>Bio-Informatics and Functional Genomics</i> Wiley Blackwell
Software and other materials	<p>Computer and internet connection</p> <p>SPSS software</p>
Activities	<p><u>Introduction to the programme and the facilities</u></p> <p>On the first day, a short introduction of students and lecturers, the way of learning and the facilities takes place.</p> <p><u>Assignments and homework</u></p> <p>The student prepares (mostly bi-weekly) assignments and discusses these in class, supported by a lecturer. These assignments cover a large part of the Body of Knowledge and Skills of this unit of study. In addition, various research skills are trained with these assignments. This way, students prepare themselves for the theoretical exam, the formal assessment of this module.</p> <p>Each assignment is introduced, and a theoretical framework is provided. Students independently study the theoretical aspects and apply the various topics in the homework assignment. Homework assignments are discussed in class to provide students with feedback.</p> <p><u>Topics:</u></p> <ul style="list-style-type: none"> - Methods in biochemistry, molecular and cell biology - Overview: The genome - Properties of biomolecules - (Regulation of) gene expression in prokaryotes and eukaryotes - Overview: Signal transduction - Overview: Cell cycle - Overview: Intracellular trafficking - Cell metabolism - Statistics: Introduction and basic statistics for biological data analysis - Bioinformatics: Using databases, Blast search, Tools for gene cloning, Databases for metabolic pathways, Genome databases, <p><u>Social programme:</u></p> <p>A social programme is part of this unit of study. During this programme, students and teachers can get to know each other personally and have fun together. The activity will be a surprise!</p>
Work formats	lectures, workshops, trainings
Lesson / Contact hours	60
Compulsory participation	<ul style="list-style-type: none"> - Start assessment - Presentations of Assignments
Education period	August - November 2022
Maximum number of participants	-

Exam of the UOS Fundamentals

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code modular exam: MMLS-FUND-EXAM	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>In the theoretical exam, these competence and knowledge criteria are translated into the following assessment criteria:</i>
Name modular exam: Fund-Exam	<p><i>Competence indicators</i></p> <p>3.1 (intermediate level): Designs experiments based on the required quality and quantity of the product or result.</p> <p>→ In the exam, the student can design experiments based on a research question.</p> <p>3.2 (intermediate level): Applies strict logical thinking to draw conclusions from the results:</p> <ul style="list-style-type: none"> - in the context of the experiments - in comparison to other analyses, reference/theoretical values, and quality requirements. 	<p><i>Knowledge criteria - Application of techniques in this exam implies the design of experiments or interpretation of data</i></p> <ul style="list-style-type: none"> • has knowledge and insight of genes, chromosomes, plasmids mutations / SNPs • Has knowledge and understanding of the principle of all standard techniques to detect DNA (such as PCR, FISH, (next generation sequencing), RNA (such as(q) RT-PCR, expression array, RNAseq, in situ hybridization) and proteins (such as SDS-PAGE, Western blot, immunocytochemistry, immunohistochemistry, protein array, mass spec) and to detect the interaction between biomolecules (e.g. immune-precipitation, chromatin-immunoprecipitation) and can apply the appropriate technique to answer a question about the presence, quantity, alteration/modification, localization or interaction of DNA, RNA or protein • understands how gene expression is regulated in prokaryotes and eukaryotes and applies this knowledge to heterologous gene 	<p>the student is able to</p> <ul style="list-style-type: none"> • Design experiments (20-25%) • Explain theoretical background (15%-20%) • Explain research aims (5-10%) • Explain experimental methods (10-15%) • Explain, analyse and interpret results (25-30%) • Draw conclusion based on experimental results (5-10%) <p><u>Knowledge indicators</u></p> <ul style="list-style-type: none"> • 5-10% statistics • 20-45% molecular biology • 20-40% cell biology • 20-40% biochemistry
Code OSIRIS:			
Type: Homework assignments and Written test of theoretical concepts and applications of the body of knowledge and skills			
Number of examiners: 2 for construction and evaluation of test and answer model, 1 for assessment, 2 nd in case of doubt			
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 100%			
Period and resit: 2 chances per study			

<p>year; Chance1: November 2022 Chance 2: February 2023</p>		<p>expression</p> <ul style="list-style-type: none"> • is able to design a strategy for gene cloning and heterologous expression • has knowledge and understanding of the mechanisms of gene silencing by siRNA and is able to apply siRNA to downregulate gene expression 	<p>In addition, the student handed in homework assignments regarding three bio-informatics cases.</p>
<p>Compensation: None</p>		<ul style="list-style-type: none"> • is able to design a (conditional) knock-out strategy (e.g. by Crispr-Cas) • is able to explain the composition and functions of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and localization 	
<p>Enrollement:</p>		<ul style="list-style-type: none"> • has knowledge and understanding of the principle of techniques to analyze cell proliferation, cell cycle, apoptosis, protein modification and can apply these techniques to answer question on such cellular functions • has knowledge and understanding of the properties of proteins, nucleic acids (DNA, RNA), sugars, lipids, endotoxin, salt, viruses and bacteria • has knowledge and understanding of biomolecule purification methods (such as size exclusion chromatography, ion exchange, hydrophobic interaction, ultrafiltration, affinity chromatography, precipitation, filtration, drying) and is able to choose a purification method depending on the composition of the original sample and the biomolecule to be purified • has knowledge and understanding of methods to analyse biomolecules (such as NMR, chromatography, 	

		<p>enzyme assays, ultrafiltration, absorption measurement, selective breakdown, enzyme immune-assay) and is able to choose an analytical method based on the biomolecule(s) to be analyzed</p> <ul style="list-style-type: none"> • has knowledge and understanding of metabolic pathways, cell chemistry and biosynthesis and can apply this knowledge to optimize metabolite production (metabolic engineering) • has insights in the principles, advantages and disadvantages of different diagnostic tests, e.g. serology and molecular diagnostics <p>Statistics</p> <ul style="list-style-type: none"> • understands the meaning of: statistical hypotheses, type of variable (continuous / categorical), association versus causation, confounding variables, variation, normal distribution, population versus sample, dependent and independent observations, Type I and Type II error, descriptive statistics, the relationship between central tendency (mean, median) and variance, p-value and statistical significance, log-transformation, one- or two-sided tests, multiple testing problems and its solutions • is able to translate the research question into an appropriate statistical question, experimental setup and corresponding statistical analysis 	
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		<ul style="list-style-type: none">• has awareness of power and sample size calculations• Is able to choose the appropriate statistical method for data Analysis, including t-test, ANOVA, multiple regression, chi square tests• is able to report the results with tables and graphics <p>Bio-informatics- Data Mining:</p> <ul style="list-style-type: none">• The student is familiar with the most prominent biological databases and their general structure (e.g. NCBI, KEGG)• The student is able to formulate a biological question in terms of data and a data integration workflow. <p>Bio-informatics - Function annotation (DNA and protein sequences):</p> <ul style="list-style-type: none">• Is able to use the principles of transcription, mRNA processing, translation, post-translational modifications and protein structure/domains to evaluate the function annotation of a nucleotide and/or protein sequence.• Is able to perform BLAST-searches and evaluates the results.	
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Drug Development

Title of UOS	Drug development HMP-MMLS-DRD
Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Drug Discovery and Development
Name UOS Alluris	HMP-MMLS-DRD
Code OSIRIS	
Code Alluris	HMP-MMLS-DRD
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
Professional Products	<ul style="list-style-type: none"> High-throughput data analysis Poster on a drug discovery strategy
Credits, study load	10 EC / 280 study load hours, consisting of ~50 contact hours (lectures, workshops and (computer) trainings), 98 contact and online studying at University of Florida and 132 hours for self-study and work on assignments.
Cohesion and admission requirements relating to exams	<ul style="list-style-type: none"> All assessments of this unit of study have to be sufficient.
General description	<p>During this unit of study, students acquire knowledge in the principle of pharmaceutical chemistry and skills in different stages of drug development by designing strategies in drug discovery, development and delivery.</p> <p>The assignments are placed in the context of cancer drug development. Students acquire knowledge and understanding of the diverse molecular and cellular processes involved in cancer development and the multiple strategies to fight the disease. Industry professionals talk about current R&D in the field of fighting cancer. Prognostic tests for treatment outcomes resulting in personal medicine are addressed as well as advanced 'omics technologies used in the field. The data analysis in this unit of study focuses on the analysis of data from high throughput screenings.</p> <p>Understanding drug design and drug properties is necessary to complete a production strategy. To this end, students study in an online environment principles of the pharmaceutical chemistry during this unit of study. Moreover, they will be trained in understanding the analyses methods used to investigate the structure-related properties of different types of drugs.</p>
Competences	<p>Competence 2: Designing strategies for applied research and product development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
Assessment criteria/	See exams of the UOS Drug Discovery and Development below this table

Indicators / requirements for the UOS.	
Exams	See exams of the UOS Drug Discovery and Development below this table
Required reading	<ul style="list-style-type: none"> ❖ Reader Drug Development ❖ Supporting High-throughput data analysis and interpretation, and Drug Discovery strategy: <ul style="list-style-type: none"> - Tamborero et al (2018).Cancer Genome Interpreter annotates the biological and clinical relevance of tumor alterations <i>Genome Medicine</i>, 10:25 - Santarius, T. et al. (2010). A census of amplified and overexpressed human cancer genes. <i>Nature Reviews Cancer</i>, 10 (1), 59-64. - Yates, L.R. & Campbell, P.J. (2012). Evolution of the Cancer Genome. <i>Nat Rev Genet</i>, 13 (11), 795-806. - The Cancer Genome Atlas Network (2012). Comprehensive molecular characterization of human colon and rectal cancer. <i>Nature</i>, 487, 330-337. - Zhang <i>et al.</i>, (2019). A survey and evaluation of Web-based tools/databases for variant analysis of TCGA data. Briefings in Bioinformatics, 20(4), 1524-1541. ❖ Alberts, Johnson, Lewis, Morgan, Raff, Roberts, and Walter, (2017). <i>Molecular Biology of the Cell</i>. (7th edition). Garland Science. ❖ Lodge, Lund & Minchin (2007): <i>Gene Cloning, Principles and Applications</i>. Tayler & Francis Group ❖ Berg, J.M., Tymoczko, J., Stryer, L. (2019). <i>Biochemistry</i>. (9th edition). W.H. Freeman. ❖ Samuel, M.L., Witmer, J.A., & Schaffner, A. (2015). <i>Statistics for the Life Sciences</i>. (5th edition). Pearson. ❖ <i>Pevsner J. (2015) Bioinformatics and Functional Genomics</i>. (3rd edition). Wiley ❖ The <i>International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (2000) SAFETY PHARMACOLOGY STUDIES FOR HUMAN PHARMACEUTICALS 57A</i> ❖ The <i>International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (2005) THE NON-CLINICAL EVALUATION OF THE POTENTIAL FOR DELAYED VENTRICULAR REPOLARIZATION (QT INTERVAL PROLONGATION) BY HUMAN PHARMACEUTICALS 57B</i> ❖ Original Research articles relevant to the assignments <p>The reading lists are updated regularly. Therefore, the actual reading list for the unit of study might deviate from the list presented above.</p>
Recommended reading	
Software and other materials	Computer and internet connection
Activities	During this unit of study, students will individually work on their assignments (see also assessment).

	<p>The supporting education programme will help students to work out their assignments and to master the exam, and therefore to achieve their learning goals.</p> <p><u>Lectures:</u></p> <ul style="list-style-type: none"> • Introduction unit of study and assignments • Molecular mechanisms in cancer development, cancer diagnosis, cancer drugs • Models to study cancer drugs: assays for drug testing • A short overview clinical trials • Lectures on R&D projects by guest lecturers • Registration of drugs • Structure elucidation analyses. <p><u>Online lectures</u></p> <ul style="list-style-type: none"> • Drug action and drug discovery • Drug design principles • Introduction to pharmacokinetics and drug biotransformation • Drug development, production, and regulation • General principles of pharmaceutical chemistry <p><u>Workshops:</u></p> <ul style="list-style-type: none"> • Cancer drugs/cancer drug development • Statistics: multiplicity tests and ANCOVA <p><u>Trainings:</u></p> <ul style="list-style-type: none"> • Analysing High-throughput drug screens <p>Assignments, (online) Lectures, Trainings, Workshops</p>
Instructional formats	Assignments, (online) Lectures, Trainings, Workshops
Teaching / Contact hours	See above: credits, study load
Mandatory participation	<ul style="list-style-type: none"> • Assessments
Period of instruction	December 2022 – April 2023
Maximum number of participants	-

Exam of the UOS Drug Discovery and Development

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code Alluris: MMLS-DRD-FPhC	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>These competence and knowledge criteria are translated into the following assessment criteria*</i>
Name modular exam: Fundamentals in Pharmaceutical Chemistry	2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues 2.2. Combines information from different sources in the context of the own project	<ul style="list-style-type: none"> understands the principles of pharmacology, pharmacokinetics & drug-biotransformation, and pharmacodynamics knows and understands drug design principles knows and understands the principle of different types of drugs and treatment approaches (such as small molecules, antibodies, gene therapy, antibiotics and anti-virals, chemotherapy, radiotherapy), their advantages and disadvantages. is able to choose one type of drug as active pharmaceutical ingredient depending on desired biological effect is able to choose a delivery system based on desired selectivity and bio-availability knows that structure-analysis can be used to predict the function of the biomolecule and to discover interaction partners/ drugs knows the different phases of clinical studies is able to define quality requirement for products and processes based on 	<p>Written assay module assignment and timed quizzes are applied to assess the following criteria:</p> <p><u>Drug Action and Drug Discovery</u></p> <ul style="list-style-type: none"> Understand the sources for new lead structures Describe the LADME process Define the terms pharmacokinetics and pharmacodynamics Evaluate a structure in terms of physicochemical properties Be able to calculate the logP using the π value equation Apply Lipinski's rule of five and the degree of ionization to predict the behavior of a substance in solution Define the terms acid and base <p><u>Drug Design Principles</u></p> <ul style="list-style-type: none"> Understand the terms ED50, therapeutic index, certain safety factor, log-dose response curve, and Lineweaver-Burke plot Relate the principle of a pharmacophore to structure activity relationship, functional group substitutions, and stereochemistry Analyze a structure according to electronic and steric effects
Code OSIRIS	2.3. Defines the project aim in terms of products and/or results based on the acquired background information		
Type: Online knowledge test	2.4. Defines the quality requirements for products and processes based on legal requirements.		
Number of examiners: 1 for construction and evaluation of test (UoF) and answer model, 1 for assessment (UoF), HAN assessor verifies.	2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel		
Assessment: Grade; Conversion of grades from University of Florida (US):			
US	HAN		
E	0		
D	5.5		

C	6		regulatory guidelines <ul style="list-style-type: none"> is aware of the requirements for entering the clinical phase, and for market entry 	<ul style="list-style-type: none"> - Present a basic understanding of quantitative structure-activity relationship (QSAR) principles - Combine their knowledge of lessons 1 and 2 to synthesize and analyze a drug structure
B-	6.5			
B+	7			
A-	7.5			
A (90.0-92.5%)	8			
A (92.5-95.0%)	8.5			
A (95.0-97.5%)	9			
A (97.5-99.9%)	9.5			
Cut-off value: 55%				
Minimal result: 5.5				
Weighting: 35%				
Period and resit: 2 chances per study year; Chance 1: April 2023 Chance 2: in agreement with University of Florida and student				
Compensation: None				
Enrollment:				
				<p><u>Introduction to Pharmacokinetics & Drug Biotransformation</u></p> <ul style="list-style-type: none"> - Understand and be able to explain the pharmacokinetic terms half-life, volume of distribution, first-order kinetics, zero-order kinetics, linear and non-linear kinetics, area under the curve (AUC), one- and multi-compartment models - Describe the differences between drug administration and pharmacokinetic behavior following enteral and parenteral routes - Distinguish between one-compartment and multicompartment pharmacokinetic models - Explain the functions of biotransformation and the impact it has on bioavailability and activity of a drug Apply the concepts of phase I and phase II metabolism - Predict the potential routes of metabolism for a drug based on structure and knowledge of the various metabolic enzymes involved in phase I and phase II metabolism <p><u>Drug Development, Production, and Regulation</u></p> <ul style="list-style-type: none"> - Describe the past and current legislation regulating drug products in the US - Explain the stages of drug development

			<ul style="list-style-type: none">- Distinguish between preclinical and clinical drug testing and its purposes- Differentiate between the regulatory authority of the FDA for marketed drug products- Understand the basics of patent protection for a drug product <p><u>Comprehensive HyLighter assignment</u></p> <ul style="list-style-type: none">- Apply knowledge learned throughout the course to the development of a new drug entity- Transfer knowledge and research information specific to a drug used in therapy <p>For details see the Syllabus PHA6432 Fundamentals of Pharmaceutical Chemistry of the University of Florida.</p>
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<p>Code Alluris: MMLS-DRD-SEA Code OSIRIS: Name: Structure Elucidation Analysis Type: Written Product Number of examiners: 2 for construction and evaluation of test and answer model, 2 for assessment. Assessment: Grade Cut-off value: 55% Minimal result: 5.5 Weighting: 30% Period and resit: 2 chances per study year; Chance 1: April 2023 Chance 2: June 2023 Compensation: None Enrollment:</p>	<p>2.1 Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues 2.2. Combines information from different sources in the context of the own project.</p>	<ul style="list-style-type: none"> Familiar with the analytical procedures of IR, MS, and NMR and understand the theory of how each technique. Understand the differences and specific advantages and disadvantages of each analytical technique introduced in this course. 	<p>See assessment form 'Structure Elucidation Analysis' on #OnderwijsOnline - General Information and in the Reader Drug Discovery and Development</p>
	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
<p>Code Alluris: MMLS-DRD-PRES Code OSIRIS:</p>	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and</p>	<ul style="list-style-type: none"> Has knowledge and understanding of the principle of all standard techniques to detect DNA (such as PCR, FISH, 	<p>See assessment form 'Poster Presentation' on #OnderwijsOnline – General Information and in the Reader</p>

Name modular exam: Poster Presentation on Drug Discovery Strategy	other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues;	(next generation) sequencing), RNA (such as(q) RT-PCR, expression array, RNAseq, in situ hybridization) and proteins (such as SDS-PAGE, Western blot, immunocytochemistry, immunohistochemistry, protein array, mass spec) and to detect the interaction between biomolecules (e.g. immune-precipitation, chromatin-immunoprecipitation) and can apply the appropriate technique to answer a question about the presence, quantity, alteration/modification, localization or interaction of DNA, RNA or protein	Drug Discovery and Development
Type: Group product	2.2. Combines information from different sources in the context of the own project		
Number of examiners: 2 for assessment	2.3. Defines the project aim in terms of products and/or results based on the acquired background information		
Assessment: Insufficient/Sufficient	3.1. Designs experiments based on the required quality and quantity of the product or result.		
Cut-off value: 55%	4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The poster presentation is at a level equivalent to a presentation at an international symposium	<ul style="list-style-type: none"> • has knowledge and understanding of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and localization 	
Minimal result: Sufficient	6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources	<ul style="list-style-type: none"> • understands the principle of techniques to analyze cell proliferation, cell cycle, apoptosis, protein modification and can apply these techniques to answer question on such cellular functions 	
Weighting: -		<ul style="list-style-type: none"> • has knowledge and understanding of the molecular mechanisms that contribute to cancer development and can apply this knowledge for the design of cancer diagnostics and 	
Period and resit: 2 chances per study year; Chance1: April 2023 Chance 2: June 2023			
Compensation: none			

Enrollment:		<p>anti-cancer drugs</p> <ul style="list-style-type: none"> • understands the principles of pharmacology, pharmacokinetics & drug-biotransformation, and pharmacodynamics • knows and understands drug design principles • knows and understands the principle of different types of drugs and treatment approaches (such as small molecules, antibodies, gene therapy, chemotherapy, radiotherapy, immunotherapy), their advantages and disadvantages • is able to choose one type of drug as an active pharmaceutical ingredient depending on the desired biological effect • is able to choose a delivery system based on desired selectivity and bio-availability. • is able to design a strategy to measure the bio-availability of the drug. • can explain methods to analyze biomolecules (such as NMR, chromatography, enzyme assays, ultrafiltration, absorption measurement, selective breakdown, enzyme immune-assay) and is able to choose an analytical method based on the biomolecule(s) to be analyzed • is able to design appropriate <i>in vitro</i> and <i>in vivo</i> assays to test the efficacy, selectivity and the toxicology of a drug • knows which animal models can be used to test drugs, and the advantages and disadvantages of 	
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		<p>these models</p> <ul style="list-style-type: none"> • understands the meaning of: statistical hypotheses, type of variable (continuous / categorical), association versus causation, confounding variables, variation, normal distribution, population versus sample, dependent and independent observations, Type I and Type II error, descriptive statistics, the relationship between central tendency (mean, median) and variance, p-value and statistical significance, log-transformation, one- or two-sided tests, multiple testing problems and its solutions • Is able to choose the appropriate statistical method for data Analysis, including t-test, ANOVA, multiple regression, chi square tests • is able to report the results with tables and graphics 	
Code Alluris: MMLS-DRD-HTDA	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS: Name modular exam: High-throughput data analysis	1.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues	<ul style="list-style-type: none"> • Understands the principle and application of statistical hypothesis, hypothesis test, one- or two-tailed test, p-value, adjustment for multiple testing <p>Data Mining</p> <ul style="list-style-type: none"> • The student is familiar with the most prominent biological databases and their general structure (e.g. NCBI, KEGG.) • The student is able to formulate a biological question 	See assessment form 'High-Throughput Data Analysis' on #OnderwijsOnline – General Information and in the Reader Drug Discovery and Development
Type: Individual written professional product	1.2. Combines information from different sources in the context of the own project		
Number of examiners: 2 for construction and evaluation of assignment and	1.5 Designs different approaches that could lead to the project aim.		

assessment form, 2 for assessment	<p>Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel</p> <p>3.2. Applies strict logical thinking to draw conclusions from the results and interprets them:</p> <ul style="list-style-type: none"> - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements. <p>4.1. (intermediate level) Reports project plans and results according to the standard format of scientific documents and the reader recognizes the scientific international conventions criteria</p>	<p>in terms of data and a data integration workflow.</p> <p>High-throughput data analysis</p> <ul style="list-style-type: none"> • understands the principle steps in analyzing high-throughput data obtained by –omics approaches. • has analyzed and interpreted a limited number of high-throughput data and is able to communicate to specialists about such analyses 	
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 35%			
Period and resit: 2 chances per study year; Chance 1: January 2023 Chance 2: March 2023			
Compensation: none			
Enrollment:			

Production of Biomolecules 1

Title of UOS	Production of Biomolecules 1 HMP-MMLS-POB1
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Production of Biomolecules 1
Name UOS Alluris	HMP-MMLS-POB1
Code OSIRIS	
Code Alluris	HMP-MMLS-POB1
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
(Professional) Products	<ul style="list-style-type: none"> Presentation on gene discovery strategy to optimize microbial oil production in yeast
Credits/ study load	<p>5 EC / 140 study load hours, consisting of 24 contact hours 116 hours for self-study and work on assignments</p>
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> All assessments of this unit of study have to be sufficient.
General description	<p>Central to this unit of study is the development of a strategy to increase the microbial oil production by yeast. To this end, bio-informatics skills will be applied by students to annotate genes and to identify gene products in yeast which might be involved in microbial oil production. Based on this, students suggest a metabolic engineering strategy to manipulate the cells in such a way that production of microbial oil can be increased. Growing cells on biobased materials is considered in the strategy as well.</p>
Competences	<p>Competence 2: Designing strategies for applied research and product development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication Competence 5: Managing projects Competence 6: Advising</p>
Assessment criteria	<p>See exams of the UOS Production of Biomolecules 1 below this table</p>
Exams	<p>See exams of the Production of Biomolecules below this table</p>
Compulsory literature	<ul style="list-style-type: none"> Students will get access to the HAN BioCentre literature database as background literature for their assignments, especially assignment 6.1.
Recommended literature	<ul style="list-style-type: none"> Alberts, Johnson, Lewis, Raff, Roberts, and Walter, (2015 or 2017). <i>Molecular Biology of the Cell</i>. (6th or 7th edition). Garland Science.

	<ul style="list-style-type: none"> ❖ Reed, Weyers & Jones (2016): <i>Practical Skills in Biomolecular Science</i>. Pearson ❖ Samuel, M.L., Witter, J.A., & Schafner, A. (2011 or 2015). <i>Statistics for the Life Sciences</i>. (4th or 5th edition). Pearson. ❖ Pevsner, J. (2015) <i>Bio-informatics and Functional Genomics</i> Wiley Blackwell. ❖ <u>Original research articles</u> related to the assignments <p>Further literature can be found in the PubMed database and journals on biotechnology/ microbiology, respectively, and might be provided with the specific assignments. To access full-text articles, students can make use of the online facilities of the HAN.</p> <p><i>The reading lists are updated regularly. Therefore, the actual reading list of this unit of study might deviate from the list presented above.</i></p>
Software and other materials	Computer and Internet connection
Activities	<p>During this unit of study, students individually work on their different assignments.</p> <p>The supporting education programme will help students to work out their assignments and to master the exam, and therefore to achieve their learning goals.</p> <p><u>Lectures</u></p> <ul style="list-style-type: none"> - Introduction Unit of Study - Introduction biotechnology - Microbial oil production in yeast - Metabolic engineering <p><u>Workshop/Trainings</u></p> <ul style="list-style-type: none"> - Bio-informatics: study databases for genes and metabolic pathways/ verify gene annotation -
Work formats	Lectures, workshops, online education, assignments
Lesson/ Contact hours	See above: credits, study load
Compulsory participation	-
Education period	May-July 2023
Maximum number of participants	-

Exams of the UOS Production of Biomolecules 1

Code Alluris: MMLS-POB1-MICRO	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Presentation on research strategy to optimize microbial oil production in yeast	2.1 Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues; 2.2. Combines information from different sources in the context of the own project → In this gene discovery strategy, the student demonstrates that he/she acquired knowledge about yeast morphology and metabolism, about metabolic pathways that contribute to microbial oil production, and about annotating genes and gene function, and combines this knowledge to describe a strategy to enhance microbial oil production from yeast.	<ul style="list-style-type: none"> • has knowledge and understanding of metabolic pathways, cell chemistry and biosynthesis and can apply this knowledge to optimize metabolite production (metabolic engineering) • The student is able to explain the composition and functions of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and localization • Has knowledge and understanding of the principle of all standard techniques to detect DNA (such as PCR, FISH, (next generation) sequencing), RNA (such as(q) RT-PCR, expression array, RNAseq, in situ hybridization) and proteins (such as SDS-PAGE, Western blot, immunocytochemistry, immunohistochemistry, protein array, mass spec) and to detect the interaction between biomolecules (e.g. immune-precipitation, chromatin-immunoprecipitation) and can apply the appropriate technique to answer a question about the presence, quantity, alteration/modification, localization or interaction of DNA, RNA or protein • is able to design a strategy for gene cloning and heterologous expression • is able to design a (conditional) knock-out strategy (e.g. by Crispr-Cas) • understands how gene expression is 	See assessment form 'Presentation on research strategy to optimize microbial oil production in yeast' on #OnderwijsOnline – General Information and in the Reader Production of Biomolecules
Type: Presentation in pairs of 2 students			
Number of examiners: 2 for construction and evaluation of assignment and assessment form, 2 for assessment			
Assessment: Grade			
Cut-off value: 55%	2.3 Defines the project aim in terms of products and/or results based on the acquired background information		
Minimal result: 5.5			
Weighting: 100%	2.5 Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs,		
Period and resit: 2 chances per study year; Chance 1: June 2023			

Chance 2: July 2023	<p>quality and personnel</p> <p>2.6 Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects)</p> <p>3.1. Designs experiments based on the required quality and quantity of the product or result</p> <p>4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium</p> <p>6.5 Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources</p>	<p>regulated in prokaryotes and eukaryotes and applies this knowledge to heterologous gene expression</p> <p>Data Mining</p> <ul style="list-style-type: none"> • The student is familiar with the most prominent biological databases Databases and their structures (e.g. NCBI, KEGG) • The student is able to formulate a biological question in terms of data and a data integration workflow. <p>Sequence Function annotation (DNA and protein sequences):</p> <ul style="list-style-type: none"> ▪ Is able to use the principles of transcription, mRNA processing, translation, post-translational modifications and protein structure/domains to evaluate the function annotation of a nucleotide and/or protein Is able to perform BLAST-searches and evaluate the results. <p>Sequence alignments and score matrices</p> <ul style="list-style-type: none"> • Knows the features of a qualitatively good alignment. • Is able to illustrate the use of (multiple) sequence alignments. • Is able to evaluate the evolution of sequences 	
Compensation: none			
Enrollment:			

Production of Biomolecules 2

Title of UOS	Production of Biomolecules 2 HMP-MMLS-POB2
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Production of Biomolecules 2
Name UOS Alluris	HMP-MMLS-POB2
Code OSIRIS	
Code Alluris	HMP-MMLS-POB2
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
(Professional) Products	<ul style="list-style-type: none"> Preparing a technical document on the production of a heterologous protein
Credits/ study load	4 EC / 112 study load hours, consisting of 18 contact hours 94 hours for self-study and work on assignments
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> All assessments of this unit of study have to be sufficient.
General description	In the unit of study Production of Biomolecules 2 students will continue their studies of part 1 by setting up a technical document for the heterologous production of a protein. Students apply their knowledge of various production strains, upstream processing, downstream processing and cost calculations. Furthermore, students will become familiar with product development for pharmaceutical purposes and the principles behind Quality by Design. The guidelines of working according to Good Manufacturing Practice (GMP) standards and the consequences thereof are also subject of this unit of study.
Competences	<p>Competence 2: Designing strategies for applied research and product development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
Assessment criteria	See exams of the UOS Production of Biomolecules below
Exams	See exams of the Production of Biomolecules below this table
Compulsory literature	<ul style="list-style-type: none"> ❖ Quality by Design: <ul style="list-style-type: none"> Bioproduction Group (2012). Quality by Design in Biomanufacturing. White paper. Available from: www.bio-g.com/ FDA (2011). Guidance for industry: process validation: general principles and practices. ❖ GMP:

	<ul style="list-style-type: none"> - ICH (2000). Good Manufacturing Practice Guide for Active Pharmaceutical Ingredients Q7. - Allport-Settle, M.J. (2009). Good Manufacturing Practice (GMP) Guidelines: The Rules Governing Medicinal Products in the European Union, EudraLex Volume 4 Concise Reference. Available from: http://ec.europa.eu/health/documents/eudralex/vol-4/index_en.htm <p>Students will get access to the HAN BioCentre literature database as background literature for their assignments, especially assignment 6.1.</p>
Recommended literature	<ul style="list-style-type: none"> ❖ Alberts, Johnson, Lewis, Raff, Roberts, and Walter, (2015 or 2017). <i>Molecular Biology of the Cell</i>, (6th or 7th Edition). Garland Science: ❖ Reed, Weyers & Jones (2016): <i>Practical Skills in Biomolecular Science</i>. Pearson ❖ Samuel, M.L., Witmer, J.A., & Schaffner, A. (2011 or 2015). <i>Statistics for the Life Sciences</i>. (4th or 5th edition). Pearson. ❖ Pevsner, J. (2015) Bio-informatics and Functional Genomics Wiley Blackwell ❖ <u>Original research articles</u> related to the assignments <p>Further literature can be found in the PubMed database and journals on biotechnology/ microbiology, respectively, and might be provided with the specific assignments. To access full-text articles, students can make use of the online facilities of the HAN.</p> <p><i>The reading lists are updated regularly. Therefore, the actual reading list of this unit of study might deviate from the list presented above.</i></p>
Software and other materials	Computer and Internet connection
Activities	<p>During this unit of study, students individually work on their different assignments.</p> <p>The supporting education programme will help students to work out their assignments and to master the exam, and therefore to achieve their learning goals.</p> <p><u>Lectures</u></p> <ul style="list-style-type: none"> - Introduction Unit of Study - Microbial oil production in yeast - Metabolic engineering - Biologicals for pharmaceutical use: Quality by Design <p><u>Workshop/Trainings</u></p> <ul style="list-style-type: none"> - Bio-informatics: study databases for genes and metabolic pathways/ verify gene annotation - Good Manufacturing Practice (GMP) <p>Lectures, workshops, online education, assignments</p>
Work formats	Lectures, workshops, online education, assignments
Lesson/ Contact hours	See above: credits, study load
Compulsory participation	-
Education period	August - September 2022
Maximum number of participants	-

Exam of the UOS Production of Biomolecules 2

		Assessment criteria/ Indicators / requirements	
Code Alluris: MMLS-POB2-PP	Code OSIRIS:	Competence indicators	Knowledge indicators
		For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria	
Name modular exam: Technical document on protein production		2.1 Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues;	<ul style="list-style-type: none"> understands the mechanisms of regulation of gene expression in pro- and eukaryotic cells and applies this knowledge for heterologous gene expression is able to design a strategy for gene cloning and heterologous expression has knowledge and understanding of biomolecule purification methods (such as size exclusion chromatography, ion exchange, hydrophobic interaction, ultrafiltration, affinity chromatography, precipitation, filtration, drying) and is able to choose a purification method depending on the composition of the original sample and the biomolecule to be purified has knowledge and understanding of methods to analyze biomolecules (such as NMR, chromatography,
Type: Individual written professional product		2.2 Combines information from different sources in the context of the own project	
Number of examiners: 2 for construction and evaluation of assignment and assessment form, 1-2 for assessment		2.3 Defines the project aim in terms of products and/or results based on the acquired background information	
Assessment: Mark		2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel	
Minimal result: 5.5			
Weighting: 100%		2.6. Designs a complete strategy	
		See assessment form 'Technical document on protein production' on #OnderwijsOnline – General Information and in the Reader Production of Biomolecules	

<p>Period and resit: 2 chances per study year; Chance1: September 2022 Chance 2: November 2022</p>	<p>leading to the project aim (project of about 3-4 months; see also: managing projects)</p> <p>3.1. Designs experiments based on the required quality and quantity of the product or result.</p> <p>4.1. (intermediate level): Reports project plans and results according to the standard format used in the company/field and the reader recognizes the scientific international conventions criteria.</p> <p>5.1. Defines project deliverables based on the needed quality and quantity</p> <p>5.2. Identifies project risks based on the (experimental) approach and on (putative) competitors</p> <p>5.3. Defines project exclusions</p> <p>5.4. Organizes the project in phases and defines decision points/milestones</p> <p>5.5. Describes the project organisation</p>	<p>enzyme assays, ultrafiltration, absorption measurement, selective breakdown, enzyme immune-assay) and is able to choose an analytical method based on the biomolecule(s) to be analyzed</p> <ul style="list-style-type: none"> • is able to identify critical parameters in the process <p>Enzymes:</p> <ul style="list-style-type: none"> • knows the industrial applications of enzymes <p>Process development and optimization:</p> <ul style="list-style-type: none"> • knows the advantages and disadvantages of different production strains and is able to choose a suitable production strain for the production of specific proteins • tests critical parameters in the production process (USP and DSP) 	
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<p>Enrollment:</p>	<p>including the responsibilities of all project members</p> <p>5.6. Writes a communication plan concerning all project members and parties involved</p> <p>5.7. Describes a times schedule based on the (experimental) plan</p> <p>5.8. Describes the required budget</p>	<p>and interprets the outcome</p> <ul style="list-style-type: none"> • is able identify critical parameters in the process • is aware of the fact that scaling up or down requires process re-optimization <p>Biobased Economy:</p> <ul style="list-style-type: none"> • is able to describe a target product profile and criteria quality attributes • Is able to explain the main principles of a biobased economy and its new technological challenges • Is able to explain the difference between first, second and third generation feedstocks • Is able to describe the steps needed to convert plant biomass into fermentation feedstock <p>Is able to describe the technological challenges by using biomass as fermentation feedstocks</p>	
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Vaccines and Diagnostics

Title of UOS	Vaccines and Diagnostics HMP-MMLS-VAD
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Vaccines and Diagnostics
Name UOS Alluris	HMP-MMLS-VAD
Code OSIRIS	
Code Alluris	HMP-MMLS-VAD
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> 1. to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology 2. to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs 3. to implement such solutions in a successful and efficient way by organizing their realization in projects, considering the interdisciplinary dimension and communicating with different experts. Such projects have a duration of at least three months.
(Professional) Products	<ul style="list-style-type: none"> • Proposal for development of a putative new/improved vaccine • Validation plan for the analytical validation of a diagnostic test
Credits, study load	9 EC / 252 study load hours, consisting of 60 contact hours and 192 hours for self-study and work on assignments
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> • All assessments and assignments of this module have to be sufficient
General description	<p>During this unit of study, students acquire knowledge and skills in the area of vaccine discovery and production, and the development and validation of a diagnostic test.</p> <p>By writing a proposal on the development of a putative new or improved vaccine, they deepen their knowledge on infectious diseases, immunological processes and the interaction between pathogens and hosts. They also focus on the production and efficacy testing of a vaccine in the R&D phase of vaccine development. Students train their professional writing skills, learning how to write a proposal that is convincing for the scientific community.</p> <p>By choosing an improved diagnostic test from literature, students will acquire knowledge and understanding of different types of diagnostic tests, and their advantages and limitations in detecting specific pathogens. Students write a validation plan for the analytical validation of their diagnostic test, thereby integrating quality and project management aspects with their scientific ideas. Statistical aspects of diagnostic tests/analytical procedures are addressed as well.</p> <p>The competence development of students is focussed on 'Designing strategies for applied research and product development', 'Design, analysis and control of experiments', 'Communication' and 'Advising'.</p>

Competences	<p>Competence 2: Designing strategies for applied research and product development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
Assessment criteria	<p>See exams of Vaccines and Diagnostics below this table</p>
Exams	<p>See exams of Vaccines and Diagnostics below this table</p>
Compulsory literature	<ul style="list-style-type: none"> ❖ Reader Vaccines and Diagnostics Onderwijs Online ❖ ATBC Scientific Writing (- OnderwijsOnline (han.nl)) ❖ Quality/Regulatory guidelines: <ul style="list-style-type: none"> ○ The <i>International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use</i>. (2005). Validation of Analytical Procedures: Text and Methodology Q2(R1). ○ Food and Drug Administration (2018). Guidance for Industry: Bioanalytical Method Validation ○ European Medicines agency (2011). Guideline on bioanalytical method validation ❖ Specific assignments Key articles are provided with the specific assignments <p>Further assignment-specific literature can be found in the PubMed database</p>
Recommended literature	<p>Books:</p> <ul style="list-style-type: none"> ❖ For immunological background: any good immunology study book, such as: <ul style="list-style-type: none"> ○ Murphy, K. (2016). <i>Janeway's Immunobiology</i> (9th edition). Garland Science ○ Belves, P.J., Martin, S.J., Burton, D.R., Roitt, I.M. (2010, 2012 or 2017). <i>Roitt's Essential Immunology</i>. (1st , 12th or 13th Edition). Wiley-Blackwell ○ Male, D., Brostoff, J., Roth, D.B. & Roitt, I.M. (2012). <i>Immunology</i> (8th edition). Philadelphia: Elsevier ○ Parts of: Alberts, Johnson, Lewis, Raff, Roberts, and Walter (2011 or 2015). <i>Molecular Biology of the Cell</i>. (6th or 7th Edition). Garland Science. ○ Wood, P. (2011). <i>Understanding Immunology</i>. (3rd edition). Person Education Limited (advice from previous student to start with in cases of very little background knowledge) => focus on the chapters about innate and adaptive immunity against pathogens, antigen presentation, activation of B and T cells, vaccination and antibody production ❖ Tang, Y., Stratton, C.W. (2013 or 2018) <i>Advanced Techniques in Diagnostic Microbiology</i> (2nd or 3rd edition). Springer, New York ❖ Samuel, M.L., Witmer, J.A., & Schaffner, A. (2011 or 2015). <i>Statistics for the Life Sciences</i> (4th or 5th edition). Pearson. ❖ Glasman-Deal, H. (2009). <i>Science Research Writing for non-native speakers of English</i>. Imperial College Press

	<p>Quality/Regulatory Guidelines:</p> <ul style="list-style-type: none"> ❖ Food and Drug Administration. (2007). Guidance for Industry and FDA Staff: Statistical Guidance on Reporting Results from Studies Evaluating Diagnostic Tests ❖ NATA Technical Note `17 – June 2012 Guidelines for the validation and verification of quantitative and qualitative test methods ❖ Publication by J. Ederveen – Practical approach to assay validation – P08090 – 2010 (sponsored by VROM). ❖ Research articles relevant to the assignments: Further assignment-specific literature can be found in the PubMed database (do not forget to make use of the Journals the HAN has access to). <p><i>The reading lists are updated regularly. Therefore, the actual reading list of the unit of study might deviate from the list presented above.</i></p>
Software and other materials	Computer and internet connection
Activities	<p>During this module, students will individually work on their central assignments which are advising on the improvement of a vaccine and the validation of a diagnostic test (see also assessment).</p> <p>The supporting education programme will help students to work out their assignments and to master the exam, and therefore to achieve their learning goals.</p> <p><u>Lectures:</u></p> <ul style="list-style-type: none"> - Lectures on immunology, infectious diseases and vaccines - Lectures on (the validation of) diagnostic tests - Guest lectures on immunology, infections, vaccines and diagnostic tests - World Café on vaccine development - Interactive lectures on advantages and disadvantages of diagnostic tests <p><u>Workshops /Trainings:</u></p> <ul style="list-style-type: none"> - Statistics for diagnostic tests
Work formats	Assignments, Lectures, Trainings, Meetings and (Peer-)Feedback
Lesson/ Contact hours	See above: Credits, study load
Compulsory participation	Assessments
Education period	October 2022 – February 2023
Maximum number of participants	-

Exam of the UOS Vaccines and Diagnostics

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code Alluris: MMLS-VAD-VAC DP	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS			
Name modular exam: Vaccine development proposal	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues;</p> <p>2.2. Combines information from different sources in the context of the own project</p> <p>2.3. Defines the project aim in terms of products and/or results based on the acquired background information</p> <p>2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel</p> <p>2.6 Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects)</p> <p>3.1 Designs experiments based on the required quality and quantity</p>	<ul style="list-style-type: none"> • has knowledge and understanding of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and localization • understand the mechanisms by which micro-organisms can cause disease • has knowledge and understanding of the immune response to pathogens (action of innate and adaptive immune system, induction and effects of cellular and humoral immunity, mechanisms for induction of memory) • knows different types of vaccines (such as attenuated, inactivated, subunit, recombinant, DNA), their mode of action and their advantages and disadvantages • is able to choose a vaccine antigen, adjuvant and administration route depending on the immune response that is required and on practical aspect • knows different vaccine production platforms, their advantages and disadvantages • is able to design experiments to test 	See assessment form 'Vaccine development proposal' on #OnderwijsOnline – General Information and in the Reader Vaccines and Diagnostics
Type: Individually written professional product			
Number of examiners: 2 for construction and evaluation of assignment and assessment form, 2 for assessment based on random sampling			
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 60%			
Period and resit: 2 chances per study year; Chance 1: December 2022 Chance 2:			

February 2023	of the product or result. 3.2 Applies strict logical thinking to draw conclusions from the results and interprets them: - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements	the potency of a vaccine	
Compensation: none			
Enrollment:	4.1. Reports project plans and results according to the standard format of scientific documents and meets the scientific international conventions criteria. 5.7 Describes a schedule based on the (experimental) plan 6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources		
Code Alluris: MMLS-VAD-VAL PL	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Validation plan for analytical validation of new/improved diagnostic test	2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues;	<ul style="list-style-type: none"> Has knowledge and understanding of the principle of all standard techniques to detect DNA (such as PCR, FISH, (next generation) sequencing), RNA (such as(q) RT-PCR, expression array, RNAseq, in situ hybridization) and proteins (such as SDS-PAGE, Western blot, 	See assessment form 'Validation plan for analytical validation of new/improved diagnostic test' on #OnderwijsOnline – General Information and in the Reader Vaccines and Diagnostics
Type: Individually written	2.2. Combines information from		-

professional product			
Number of examiners: 2 for construction and evaluation of assignment and assessment form, 2 for assessment			
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 40%			
Period and resit: 2 chances per study year; Chance 1: January 2022 Chance 2: March 2022			
Compensation: none			
	<p>different sources in the context of the own project</p> <p>2.3. Defines the project aim in terms of products and/or results based on the acquired background information</p> <p>2.4. Defines the quality requirements for products and processes based on legal requirements.</p> <p>2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel</p> <p>2.6. Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects)</p> <p>3.1. Designs experiments based on the required quality and quantity of the product or result.</p> <p>4.1. Reports project plans and</p>	<p>immunocytochemistry, immunohistochemistry, protein array, mass spec) and to detect the interaction between biomolecules (e.g. immune-precipitation, chromatin-immunoprecipitation) and can apply the appropriate technique to answer a question about the presence, quantity, alteration/modification, localization or interaction of DNA, RNA or protein</p> <ul style="list-style-type: none"> • has knowledge and understanding of methods to analyze biomolecules (such as NMR, chromatography, enzyme assays, ultrafiltration, absorption measurement, selective breakdown, enzyme immune-assay) and is able to choose an analytical method based on the biomolecule(s) to be analyzed • has knowledge and understanding of prokaryotic and eukaryotic cells, function of organelles, cell cycle regulation, DNA repair, signal transduction, protein modification and 	

<p>Enrollment:</p>	<p>results according to the standard format of scientific documents and meets the scientific international conventions criteria.</p>	<p>localization</p> <ul style="list-style-type: none"> • knows different types of diagnostic tests, their principle of action and their advantages and disadvantages • understands the principles, advantages and disadvantages of different diagnostic tests, e.g. serology and molecular diagnostics • is able to define the importance of sensitivity, specificity, and practical aspects such as costs, duration or required trained staff, based on the desired application of the diagnostic test • is able to choose a type of diagnostic test based on the required specificity, sensitivity and practical aspects such as duration, requirement for staff training • is able to define quality requirement for products and processes based on regulatory guidelines • is able to design a strategy to validate a diagnostic test • is able to apply statistics to determine the precision, sensitivity and specificity of a diagnostic test, and to understand ROC curves • Is able to choose the appropriate statistical method for data Analysis, including t-test, ANOVA, multiple regression, chi square tests 	
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Research and Product Development Skills 1

Title of UOS	Research and Product Development Skills 1 HMP-MMLS-RD1
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Research and Product Development Skills 1
Name UOS Alluris	HMP-MMLS-RD1
Code OSIRIS	
Code Alluris	HMP-MMLS-RD1
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> 1. to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology 2. to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
(Professional) Products	<ul style="list-style-type: none"> • Scientific document • R&D Presentation • Research performance 1 • Design of Experiments • Scientific report
Credits/ study load	<p>23 EC / 644 study load hours, consisting of 55 contact hours at HAN and 589 contact hours learning on the (placement) workplace of which 280 hours related to professional products and 309 hours related to professional performance development</p>
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> • All assessments of this unit of study have to be sufficient.
General description	<p>This unit of study focuses on the skills necessary for research and product development in various stages of product development pipelines in bioscience. Students become aware of the different stages of the product development pipelines in bio business and will develop the necessary Research and Product Development skills required to run projects within this pipeline.</p> <p>Research skills trained in this unit of study comprise finding and interpreting relevant literature, experimental excellence, data analysis and interpretation, and Design of Experiments. In addition, students are trained in scientific writing, presenting and discussions, and advising about the own or similar projects in an interdisciplinary context.</p> <p>Students perform this unit of study in the context of their (placement) workplace. The product, a Scientific report, and the Design of Experiments are preferentially produced by students using their very own professional environment.</p> <p>Students with work experience prior to the study programme can demonstrate that the already acquired the intermediate competence level by handing in a portfolio at the start of the unit of study. After demonstration of this intermediate level, they are exempted from the respective study activities.</p>

	<p>This competences Designing strategies for applied research and product development, Design, analysis and control of experiments and Communication are the focus in this unit of study.</p> <p>These competences are integrally applied with competences in Managing Projects, which are trained during the unit of study Managing Projects 1 that runs in parallel to this unit of study.</p>
Competences	<p>Competence 1: Professional conduct and guiding professional development Competence 2: Designing strategies for applied research and product development Competence 3: Design, analysis and control of experiments Competence 4: Communication Competence 5: Managing projects Competence 6: Advising</p>
Assessment criteria	<p>See exams of the UOS R&D Skills below this table</p>
Exams	<p>❖</p>
Compulsory literature	<ul style="list-style-type: none"> ❖ Reader Research and Product Development Skills ❖ Scientific literature related to the (placement) workplace projects and provided during the unit of study ❖ Quality Guidelines of the ICH ❖ Scientific writing guide (provided on Onderwijs Online)
Recommended literature	<ul style="list-style-type: none"> ❖ Glasman-Deal; H. (2009). <i>Science Research Writing for Non-Native Speakers of English</i>. Imperial College Press ❖ Stevens, M. (2007). <i>Subtleties of Scientific Style</i>. Scincescape Editing, Australia <p>The reading lists are updated regularly. Therefore, the actual reading list of the unit of study might deviate from the list presented above.</p>
Software and other materials	<p>Computer and Internet connection SPSS Statistics</p>
Activities	<p>During this unit of study, students individually learn on their (internship) workplace by contributing to project work and working on their different assignments.</p> <p>The supporting education programme will help students to work out their assignments and to develop to the required level in practice, and therefore to achieve their learning goals.</p> <p><u>Lectures</u></p> <ul style="list-style-type: none"> - Introduction into the product development pipelines <p><u>Workshop/Trainings</u></p> <ul style="list-style-type: none"> - Research skills and Project Development Skills (e.g. Journal clubs, analysing scientific literature, market surveys) - Design of Experiment (DOE as part of Statistics) - Scientific writing - Presenting skills - Peer feedback sessions and question hours <p>Learning on the (placement) work place, lectures, workshops, practical, meetings</p>
Work formats	<p>Learning on the (placement) work place, lectures, workshops, practical, meetings</p>
Lesson/ Contact hours	<p>See above: credits/ study load</p>
Compulsory participation	<p>The participation in the placement according to the placement contract is compulsory for students enrolled in the full-time programme.</p>

Education period	September 2022 – August 2023
Maximum number of participants	The maximum number of participants is defined by the number of (placements) workplaces for the full-time programme. The number of participants taking part in this unit of study as part-time or modular student is unlimited.

Exam of the UOS Research and Product Development Skills 1

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code Alluris: MMLS-RD1-SD	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>assessment criteria</i>
Code OSIRIS:			
Name modular exam: Scientific document	4.1. (intermediate level): Reports project plans and results according to the standard format of scientific documents and the reader recognizes the scientific international conventions criteria.	<i>Depending on context of (internship) workplace</i>	See assessment form 'Scientific Document' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual written professional product			
Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor			
Assessment: Sufficient/ insufficient			
Cut-off value: -			
Minimal result: sufficient			
Weighting: 0%			
Period and resit: 2 chances per study year; Chance1 : November 2022(ft); September 2022-July 2023 (pt) Chance 2: January 2023 (ft);			

in agreement with student (pt)			
Compensation: None			
Enrollment:			
Code Alluris: MMLS-RD1-P	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: R&D Presentation	4.2. (intermediate level): Presents experimental data and results in English to colleagues.	<i>Depending on context of (internship) workplace</i>	See assessment form 'R&D Presentation' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual presentation			
Number of examiners: 2 for construction and evaluation of criteria, 1 for assessment considering advice of workplace supervisor			
Assessment: Sufficient / insufficient			
Cut-off value: -			
Minimal result: sufficient			
Weighting: 0%			
Period and resit: 2 chances per study year; Chance 1: January 2023(ft); September 2022-July 2023 (pt) Chance 2: February 2023 (ft), in agreement with			

student (pt)			
Compensation: None			
Enrollment:			
Code Alluris: MMLS-RD1- RP1	Competence indicators	Knowledge indicators	Assessment criteria
Code OSIRIS			
Name modular exam: Research performance 1	Intermediate Level (insufficient/ sufficient) 1.1. (intermediate level): Is able to independently acquire knowledge in a new subject by consulting specific literature 1.2. (intermediate level): Combines information from different sources in the context of the own experiment 1.3. (intermediate level): Designs different approaches that could lead to the experimental results. Evaluates these possibilities and justifies the choice based on arguments and practical parameters. 3.1. (intermediate level): Designs experiments based on a requested intermediate product. 1.1. (intermediate level): Applies strict logical thinking to draw conclusions from the results: - in the context of the experiments - in comparison to other analyses, reference/theoretical values, and quality requirements. 3.3. (intermediate level): Solves practical problems if experiments do not work as planned (trouble	<i>Depending on context of (internship) workplace</i>	See assessment form 'Research Performance 1' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Performance assessment			
Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor			
Assessment: Sufficient/insufficient			
Cut-off value: All criteria sufficient			
Minimal result: sufficient			
Weighting: 0%			
Period and resit: 2 chances per study year; Chance 1: June-August 2023 (ft), September 2022 – September			

2024 (pt) Chance 2: November 2023 (ft), in agreement with student (pt)	shooting); consults colleagues if necessary. 1.1. (intermediate level): Describes a schedule for a set of necessary experiments. 1.11. (intermediate level): Works efficiently towards a set of defined deliverables. 1.12. (intermediate level): Is in control of the experiments. 1.13. (intermediate level): Is flexible with changing circumstances by adapting the experimental strategy 1.2. (intermediate level): Actively participates in a discussion about related projects by asking critical questions. 1.3. (intermediate level): Advises about follow-up projects of the own experiments. 1.4. (intermediate level): Gives advice about choosing new equipment.		
Compensation: None			
Enrollment:			
Code Alluris: MMLS-RD1-DoE	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Design of experiments	3.1. Designs experiments based on the required quality and quantity of the product or result. 3.2. Applies strict logical thinking to draw conclusions from the results and interprets them: - in view of the experiments - in view of the project aim (helicopter view)	<ul style="list-style-type: none"> understands the basics of design of experiments (DoE) methodology, including: design of experiments, randomization, blocking by nuisance factor, factorial design, screening design, comparative designs, optimization design, one-factor at a time is able to design and analyze a 	See assessment form 'Design of Experiments' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Group activity and individual written professional product			
Number of examiners:			

2 for construction and evaluation of criteria, 2 for assessment considering advice of workplace supervisor	<p>- in comparison to other analyses, reference/theoretical values, and quality requirements.</p> <p>5.1 Defines project deliverables based on the needed quality and quantity</p> <p>5.2 Identifies project risks based on the (experimental) approach and on (putative) competitors</p>	<p>screening and / or process optimization experiment using experimental design</p> <ul style="list-style-type: none"> • is able to report the results with tables and graphics 	
Assessment: sufficient/insufficient			
Cut-off value: sufficient			
Minimal result: sufficient			
Weighting: 0%			
Period and resit: 2 chances per study year; Chance 1: February 2023 Chance 2: April 2023 (ft), in agreement with student (pt)			
Compensation: none			
Code modular exam: MMLS-RD1-SR	<p>3.2 Applies strict logical thinking to draw conclusions from the results and interprets them:</p> <ul style="list-style-type: none"> - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements. 	<p><i>Depending on context of (internship) workplace</i></p>	<p>See assessment form 'Scientific Report' on #OnderwijsOnline – General Information and in the Reader Workplace Learning</p>
Name modular exam: Scientific Report			
Type: Individual written professional product			

<p>Number of examiners: 2 for construction and evaluation of criteria, 2 for assessment considering advice of workplace supervisor</p>	<p>3.3 Solves practical problems if experiments do not work as planned (trouble shooting); couples back to the theory or consults colleagues if necessary; suggests alternative experiments.</p>		
<p>Assessment: Grade</p>	<p>4.1. (intermediate level): Reports project plans and results according to the standard format of scientific documents and the reader recognizes the scientific international conventions criteria.</p>		
<p>Cut-off value: 55%</p>			
<p>Minimal result: 5.5</p>			
<p>Weighting: 100%</p>			
<p>Period and resit: 2 chances per study year; Chance1: August 2023 (ft), August 2023 – August 2024 (pt) Chance 2: October 2023(ft), in agreement with student</p>			
<p>Compensation: None</p>			
<p>Enrollment:</p>			

Research and Product Development Skills 2

Title of UOS	Research and Product Development Skills 2 HMP-MMLS-RD2
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Research and Product Development Skills 2
Name UOS Alluris	HMP-MMLS-RD2
Code OSIRIS	
Code Alluris	HMP-MMLS-RD2
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> 1. to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology 2. to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs
(Professional) Products	<ul style="list-style-type: none"> • Quality guidelines assignment • Business plan/case • Research performance 2
Credits/ study load	<p>10 EC / 280 study load hours, consisting of 25 contact hours at HAN and 255 contact hours learning on the (placement) workplace of which 130 hours related to professional products and 125 hours related to professional performance development</p>
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> • Successful completion of the modular exams "Research Performance 1" of the unit of study Research and Product Development Skills 1 is entry requirement for the assessment of "Research Performance 2" of this unit of study • All assessments of this unit of study have to be sufficient.
General description	<p>This unit of study is a follow-up of the unit of study Research and Product Development Skills 1. It again focuses on the skills necessary for research and product development in various stages of product development pipelines in bioscience. Students become aware of the different stages of the product development pipelines in bio business and will develop the necessary Research and Product Development skills required to run projects within this pipeline.</p> <p>Research skills trained in this unit of study comprise finding and interpreting relevant literature, experimental excellence, data analysis and interpretation. Product development skills of this unit of study comprise interpreting relevant quality guidelines and develop a business plan/case. In addition, students are trained in scientific writing, presenting and discussions, and advising about the own or similar projects in an interdisciplinary context.</p> <p>Students perform this unit of study in the context of their (placement) workplace. Their studies on quality guidelines and business development are preferentially related to their own professional environment.</p>

	<p>These competences Designing strategies for applied research and product development, Design, analysis and control of experiments and Communication are the focus in this unit of study.</p> <p>These competences are integrally applied with competences in Managing Projects, which are trained during the unit of study Managing Projects 2 that runs in parallel to this unit of study.</p>
Competences	<p>Competence 1: Professional conduct and guiding professional development Competence 2: Designing strategies for applied research and product development Competence 3: Design, analysis and control of experiments Competence 4: Communication Competence 5: Managing projects Competence 6: Advising</p>
Assessment criteria	<p>See exams of the UOS R&D Skills below this table</p>
Exams	<p>❖</p>
Compulsory literature	<ul style="list-style-type: none"> ❖ Reader Research and Product Development Skills ❖ Scientific literature related to the (placement) workplace projects and provided during the unit of study ❖ Quality Guidelines of the ICH ❖ Scientific writing guide (provided online on Onderwijs Online)
Recommended literature	<ul style="list-style-type: none"> ❖ Glasman-Deal; H. (2009). <i>Science Research Writing for Non-Native Speakers of English</i>. Imperial College Press <p><i>The reading lists are updated regularly. Therefore, the actual reading list of the unit of study might deviate from the list presented above.</i></p>
Software and other materials	<p>Computer and Internet connection</p>
Activities	<p>During this unit of study, students individually learn on their (placement) workplace by contributing to project work and working on their different assignments.</p> <p>The supporting education programme will help students to work out their assignments and to develop to the required level in practice, and therefore to achieve their learning goals.</p> <p><u>Lectures</u></p> <ul style="list-style-type: none"> - Overview Quality guidelines - Business development and writing business plans <p><u>Workshop/Trainings</u></p> <ul style="list-style-type: none"> - Research skills and Project Development Skills (e.g. Journal clubs, analysing scientific literature, market surveys) - Scientific writing - Interpreting quality guidelines - Patent searches & summarizing patent claims (given by an expert from the Dutch Patent Office) - Feedback session and question hour - Scientific writing for non-specialists
Work formats	<p>Learning on the (placement) work place; lectures; workshops; practical, meetings</p>
Lesson/ Contact hours	<p>See above: credits/ study load</p>

Compulsory participation	The participation in the placement according to the placement contract is compulsory for students enrolled in the full-time programme.
Education period	September 2022 – February 2023
Maximum number of participants	The maximum number of participants is defined by the number of (placements) workplaces for the full-time programme. The number of participants taking part in this unit of study as part-time or modular student is unlimited.

Exam of the UOS Research and Development Skills 2

Assessment criteria/ Indicators / requirements			
Code Alluris: MMLS-RD2- RP2	Competence indicators	Knowledge indicators	Assessment criteria
Code OSIRIS:			
Name modular exam: Research performance 2	<p>1.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues</p> <p>1.2. Combines information from different sources in the context of the own project</p> <p>2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel.</p> <p>1.1. Designs experiments based on the required quality and quantity of the product or result.</p> <p>1.2. Applies strict logical thinking to draw conclusions from the results and interprets them:</p> <ul style="list-style-type: none"> - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements. <p>3.3. Solves practical problems if</p>		See assessment form 'Research Performance 2' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Performance assessment			
Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor			
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 60%			
Period and resit: 2 chances per study year; Chance1: January/February 2023 (ft), January/February 2023- August 2025 (pt) Chance 2: March 2023 (ft);			

<p>in agreement with student (pt)</p>	<p>experiments do not work as planned (trouble shooting); couples back to the theory or consults colleagues if necessary; suggests alternative experiments.</p>		
<p>Compensation: none</p>	<p>5.11. Sets priorities and works efficiently towards the defined project aim/deliverables 5.12. Is in control of the project during all phases by being pro-active if the project does not run according to the plans and initiating an alternative strategy 5.13. Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy 5.14. Obtains the deliverables in time and with the described resources; if not, reasons and justifies the decisions that have been taken in the course of the project 6.1. Actively involves different specialist to collect advise contributing to the progress of the project. 6.2. Actively participates in a discussion about related projects by asking critical questions and suggesting follow-up experiments. 6.3. Advises about follow-up projects of the own project. 6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources</p>	<p>Knowledge indicators</p>	<p>For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria</p>
<p>Enrollment:</p>			
<p>Code Alluris: MMLS-RD2-Q</p>			
<p>Code OSIRIS:</p>	<p>Competence indicators</p>		

<p>Name modular exam: Assignment on quality guidelines</p>	<p>2.4 Defines the quality requirements for products and processes based on legal requirements.</p>	<ul style="list-style-type: none"> • Is able to define quality requirements for products and processes based on regulatory guidelines • Is able to describe a target product profile and critical quality attributes 	<p>See assessment form 'Assignment on quality guidelines' on #OnderwijsOnline – General Information and in the Reader Workplace Learning</p>
<p>Type: Individual assignment and group discussion</p>			
<p>Number of examiners: 2 for construction and evaluation of criteria, 2 for assessment considering advice of workplace supervisor</p>			
<p>Assessment: Grade</p>			
<p>Cut-off value: 55%</p>			
<p>Minimal result: 5.5</p>			
<p>Weighting: 40%</p>			
<p>Period and resit: 2 chances per study year; Chance1: October 2022 (ft), October 2022 – August 2024 (pt) Chance 2: December 2022(ft), in agreement with student (pt)</p>			

Compensation: none			
Enrollment:			
Code Alluris: MMLS-RD2-BP	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Business plan	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues</p> <p>2.2. Combines information from different sources in the context of the own project</p> <p>2.3. Defines the project aim in terms of products and/or results based on the acquired background information</p> <p>2.4. Defines the quality requirements for products and processes based on legal requirements.</p> <p>2.5. Designs different approaches that could lead to the project aim.</p>	<ul style="list-style-type: none"> • is able to use patent databases to identify patent blocks • is aware that he/she needs to contact patent experts if he/she is not sure how to interpret patent databases • is aware of the rights derived from intellectual properties and understands which implications these have for the production of generics and biosimilars • understands the meaning of the terms business models and business development, business value and financing • is able to translate his/her projects plans in a concise business plan • is able to define quality requirement for products and processes based on 	See assessment form 'Business plan' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual document			
Number of examiners: 2 for construction and evaluation of criteria, 2 for assessment considering advice of workplace supervisor			
Assessment: sufficient/ insufficient			
Cut-off value: -			
Minimal result: sufficient			
Weighting: 0%			

<p>Period and resit: 2 chances per study year; Chance1: January 2023 (ft), January 2023 - August 2024 (pt) Chance 2: March 2023 (ft), in agreement with student (pt)</p>	<p>Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel</p> <p>2.6 Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects)</p> <p>2.7 Identifies opportunities to patent products, results and strategies</p> <p>3.1 Designs experiments based on the required quality and quantity of the product or result.</p> <p>4.3 Describes the key message of the project relevant for patenting, registration, and/or business development. Uses terminology that is understandable for experts from different departments</p> <p>5.1 Defines project deliverables based on the needed quality and quantity</p> <p>5.2 Identifies project risks based on the (experimental) approach and on (putative) competitors</p> <p>5.4. Organizes the project in phases and defines decision points/ milestones</p> <p>5.7 Describes a schedule based on the (experimental) plan</p> <p>5.8 Describes the required budget</p> <p>6.4 Integrates own project results in the multidisciplinary defined goals and advises other departments</p>	<p>regulatory guidelines</p> <ul style="list-style-type: none"> • is able to describe a target product profile and critical quality attributes 	
<p>Compensation: None</p> <p>Enrollment:</p>			

Managing Projects 1

Title of UOS	Managing Projects 1 HMP-MML-S-PRJM1
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Managing Projects 1
Name UOS Alluris	HMP-MML-S-PRJM1
Code OSIRIS	
Code Alluris	HMP-MML-S-PRJM1
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology to implement such solutions in a successful and efficient way by organizing their realization in projects, considering the interdisciplinary dimension and communicating with different experts. <p>Such projects have a duration of at least three months.</p>
Professional Products	<ul style="list-style-type: none"> Professional toolbox (intermediate level) including a Network Analysis (intermediate level) Project proposal
Credits/ study load	<p>15 EC / 420 study load hours, consisting of 60 contact hours and 360 hours learning on the (placement) workplace of which 140 hours related to professional products and 220 related to professional development</p>
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> All assessments of this unit of study have to be sufficient.
General description	<p>Focus of this unit of study is the training of the competences Professional conduct and Guiding the Professional Development, and Managing Projects. Students perform this unit of study in the context of their own (placement) workplace, and are supported in their development by various teaching and assessment activities.</p> <p>In the beginning, the unit of study focusses on collecting a professional toolbox and getting the awareness of challenges when managing projects. A network analysis gives students insights in the network available to them in comparison to the expertise required for their professional tasks and learning goals.</p> <p>Next, students are trained in the project planning including the definition of deliverables and their quality, project stages, milestones, decision points, exclusions, risks and strategies to deal with them, the project organization and communication plan, a time schedule and budget planning.</p>

	Students acquire knowledge and understanding during the interactive classes, and apply this in practice on their (placement) workplace. The experiences made in practice are discussed during classes. This unit of study is integrally carried out with the unit of study Research and Product Development Skills which runs in parallel to this unit of study.
Competences	<p>Competence 1: Professional conduct and guiding professional development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
Assessment criteria	See exams of the UOS Managing Projects 1 below this table
Exams	See exams of the UOS Managing Projects 1 below this table
Compulsory literature	<ul style="list-style-type: none"> ❖ Provided lecture material ❖ Meyer, E. (2014). The culture map: Decoding how people think, lead and get things done across cultures."Public Affairs, United States ❖ <p><i>The reading lists are updated regularly. Therefore, the actual reading list of this unit of study might deviate from the list presented above.</i></p>
Software and other materials	<ul style="list-style-type: none"> -
Activities	<p><u>Collecting the Professional Toolbox:</u></p> <ul style="list-style-type: none"> - Workshops, Intervention/ supervision <p><u>Planning and control of projects</u></p> <ul style="list-style-type: none"> - The classes cover organisational, attitude and communication aspects of managing projects. Aim, result, exclusions and presentation techniques - Defining Project phases and Work breakdown - Project Organization and communication, organizing project meetings - Risk management, Techniques used in project meetings - Presentation of Project Work Plans <p>Individual feedback is given on drafts of the project proposals.</p> <p>Classes are held in an interactive way making the transfer of theory possible.</p>
Work formats	Learning on the (placement) work place, assignments, lectures, workshops
Lesson/ Contact hours	See above: credits/ study load
Compulsory participation	The participation in the placement according to the placement contract is compulsory for students enrolled in the full-time programme.
Education period	September 2022 – August 2023
Maximum number of participants	The maximum number of participants is defined by the number of (placements) workplaces for the full-time programme.

	The number of participants taking part in this unit of study as part-time or modular student is unlimited.
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Exam of the UOS Managing Projects 1

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code Alluris: MMLS-PRJM1 – PT	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria</i>
Code OSIRIS:			
Name modular exam: Professional toolbox	<p>1.1. (intermediate level): Shows a professional, pro-active, curious, touching scientific attitude: adapts quickly, motivates him/herself, shows initiative, is goal-oriented, and acts honestly and efficiently</p> <p>1.2. (intermediate level): Works efficiently in a team (colleagues, project leader, client) during the experimental phase of a project through open communication.</p> <p>1.3. (intermediate level): uses a professional network within the own organisation</p> <p>1.5. (intermediate level): Critically reflects on the own role in the experimental phase of a project.</p> <p>1.6. (intermediate level): Critically reflects on the own personality.</p> <p>1.7. (intermediate level): Defines personal learning goals (based on project/work requirements).</p> <p>4.5. (intermediate level): Contributes to the efficiency of meetings by being prepared.</p> <p>4.6. (intermediate level): Is efficient in keeping the project leader informed on progress of the experiments.</p> <p>5.9. (intermediate level): Performs</p>	<i>Depending on context of the (internship) workplace</i>	See assessment form 'Professional Toolbox' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual performance			
Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor			
Assessment: Sufficient / insufficient			
Cut-off value: -			
Minimal result: sufficient			
Weighting: 0%			
Period and resit: 2 chances per study year; Chance 1: June- August 2023 (ft), September 2022-august 2024 (pt) Chance 2: November 2023 (ft), in agreement with student (pt)			

	his/her responsibilities.		
Compensation: None			
Enrollment:			
Code Alluris: MMLS-PRJM1-PP	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Project Proposal	<p>2.2. Combines information from different sources in the context of the own project.</p> <p>2.3. Defines the project aim in terms of products and/or results based on the acquired background information.</p> <p>2.4. Defines the quality requirements for products and processes based on customer / legal requirements.</p> <p>2.5 Designs different approaches that could lead to the project aim.</p>	<i>Depending on context of the (internship) workplace</i>	See assessment form 'Project Proposal' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual written professional product			
Number of examiners: 2 for construction and evaluation of criteria, 2 for assessment considering advice of workplace supervisor			
Assessment:			

Grade	<p>Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel</p> <p>2.6. Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects).</p> <p>3.1 Designs experiments based on the required quality and quantity of the product or result.</p> <p>4.1. (intermediate level): Reports project plans and results according to the standard format of scientific documents and the reader recognizes the scientific international conventions criteria.</p> <p>4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium.</p> <p>5.1. Defines project deliverables based on the needed quality and quantity.</p> <p>5.2. Identifies project risks based on the (experimental) approach and on (putative) competitors.</p> <p>5.3. Defines project exclusions.</p> <p>5.4. Organizes the project in phases and defines decision points/milestones.</p> <p>5.5. Describes the project organisation including the responsibilities of all</p>		
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 100%			
Period and resit: 2 chances per study year; Chance 1: May/June 2023 (ft), May/June 2023- June 2024 (pt) Chance 2: August/September 2023 (ft), in agreement with student (pt)			
Compensation: None Enrollment:			

	<p>project members.</p> <p>5.6. Writes a communication plan concerning all project members and parties involved.</p> <p>5.7. Describes a schedule based on the (experimental) plan.</p> <p>5.8. Describes the required budget.</p> <p>6.1. Actively involves different specialist to collect advise contributing to the progress of the project.</p>		
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Managing Projects 2

Title of UOS	<i>Managing Projects 2</i> HMP-MML-S-PRJUM2
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in Master in Molecular Life Sciences programme
Title of UOS	Managing Projects 2
Name UOS Alluris	HMP-MML-S-PRJUM2
Code OSIRIS	
Code Alluris	HMP-MML-S-PRJUM2
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 'OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology to implement such solutions in a successful and efficient way by organizing their realization in projects, considering the interdisciplinary dimension and communicating with different experts. Such projects have a duration of at least three months.
Professional Products	<ul style="list-style-type: none"> SWOT, Personal Development Plan/Start-Stop-Continue and Reflection Project and professional portfolio
Credits/ study load	7 EC / 196 study load hours, consisting of 20 contact hours and 176 hours learning on the (placement) workplace of which 56 hours related to professional products and 120 related to professional development
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> The modular exams "Professional Conduct 1" and "Professional Conduct 2" of the unit of study Managing Projects 1 are successfully completed for the assessment of "Professional Effectiveness" of the unit of study Managing Projects 2. The modular exam "Project Proposal" of the unit of study Managing Projects 1 is successfully completed for the assessment of the modular exam "Reflection on Project Proposal Realisation and contribution" of the unit of study Managing Projects 2. All assessments of this module have to be sufficient.
General description	<p>This unit of study is a follow-up of the Managing Projects 1 course. Focus is on further developing Professional conduct and Professional Development, and Managing Projects skills. Students perform this unit of study in the context of their own (placement) workplace, and are supported in their development by various teaching and assessment activities.</p> <p>The core of this module is the development of Professional Effectiveness. As part of this, students investigate their professional Strength, Weaknesses, Opportunities and Threats 1. They define personal learning goals, work on realising these goals in their professional and study context, and reflect on their progression on a regular base.</p> <p>The training inter-personal effectiveness focusses on insights and skills required to efficiently contribute to and control projects within teams.</p>

	<p>Students become familiar with personal learning styles , leadership styles and communication styles; the concept of situational leadership and different organizational cultures. Principles of time management, how to organize efficient project meetings and ways of dealing with conflicts are also part of this training.</p> <p>At the end of this unit of study, students critically reflect on the of project(s) they were involved in and define improvements for their graduation project.</p> <p>Students acquire knowledge and understanding during the interactive classes and apply this in practice on their (placement) workplace.</p> <p>This unit of study is integrally carried out with the unit of study Research and Product Development Skills 2 which runs in parallel to this unit of study.</p>
Competences	<p>Competence 1: Professional conduct and guiding professional development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
Assessment criteria	<p>See exams of the UOS Managing Projects 2 below this table</p>
Exams	<p>See exams of the UOS Managing Projects 2 below this table</p>
Compulsory literature	<p>❖ Provided lecture material</p> <p>❖ Meyer, E. (2014). The culture map: Decoding how people think, lead and get things done across cultures. "Public Affairs, United States</p> <p><i>The reading lists are updated regularly. Therefore, the actual reading list of this unit of study might deviate from the list presented above.</i></p>
Software and other materials	<p>-</p>
Activities	<p><u>Professional identity</u></p> <ul style="list-style-type: none"> - Workshops, Intervention/ supervision <p><u>Interpersonal effectiveness</u></p> <ul style="list-style-type: none"> - Work styles, personal effectiveness, time management - Communication and communication styles - Situational leadership and styles in decision-making - Organisation cultures and handling conflicts, management game - Discussion of practical experiences <p>Lecturers are held in an interactive where transfer of theory is facilitated by discussions and exercises.</p>
Work formats	<p>Learning on the (placement) work place; assignments, lectures, workshops, trainings</p>
Lesson/ Contact hours	<p>See above: credits/ study load</p>
Compulsory participation	<p>The participation in the placement according to the placement contract is compulsory for students enrolled in the full-time programme.</p>

Education period	September 2021 - February 2022
Maximum number of participants	The maximum number of participants is defined by the number of (placements) workplaces for the full-time programme. The number of participants taking part in this unit of study as part-time or modular student is unlimited.

Exam of the UOS Managing Projects 2

	Assessment criteria/ Indicators / requirements		
	<i>Competence indicators</i>	<i>Body of Knowledge and Skills</i>	<i>Assessment criteria</i>
Code Alluris: MMLS-PRJM2-R Code OSIRIS: Name modular exam: Reflection on project proposal realization and contribution Type: Active participation in group discussion Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment Assessment: sufficient/insufficient Cut-off value: - Minimal result: sufficient Weighting: 0% Period and resit: 2 chances per study year; December 2022 (ft), December 2022– August 2024 (pt) Chance 2: January 2023 (ft),	1.4 Critically reflects on the project with respect to scientific project management approach and results. 1.5 Critically reflect on the own role in the course of a project. 5.13 Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy.	<i>Depending on context of the (internship) workplace</i>	See assessment form 'Reflection on project proposal realization and contribution' on #OnderwijsOnline – General Information and in the Reader Workplace Learning -

in agreement with student (pt)			
Compensation: None			
Enrollment:			
Code Alluris: MMLS-PRJM2-PE	Competence indicators	Knowledge indicators	For this assignment, these indicators and knowledge criteria are translated into the following assessment criteria
Code OSIRIS:			
Name modular exam: Professional Effectiveness	1.1. Shows a professional, pro-active, curious, scientific and entrepreneurial attitude: adapts quickly, motivates him/herself, shows initiative, is goal-oriented, and acts honestly and efficiently	- Has insight in different factors that contribute to an effective communication process. - Is aware of his own cognitive style and recognizes the styles of team members. - Knows how to deal with possible conflicts.	See assessment form 'Professional Effectiveness' on #OnderwijsOnline – General Information and in the Reader Workplace Learning
Type: Individual assessment of professional performance, written products	1.2 Works efficiently in a team (colleagues, project leader, client) during all phases of the project through open communication and by considering the needs of others	- Is aware of intercultural differences. - Knows the principles of situational leadership.	
Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor	1.3 Pro-activity contributes to setting up and maintaining a professional network.		
Assessment: Grade	1.6 Critically reflects on the own personality and how this influences professional conduct.		
Cut-off value: 55%	1.7 Defines personal learning goals (based on project/work requirements) and guides personal development to reach learning goals		
Minimal result: 5.5	4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at		
Weighting: 100%			
Period and resit: Chance1: January/February 2023 (ft), January/February			

2023 – August 2024(pt) Chance 2: March 2023 (ft), in agreement with student (pt)	an international symposium. 4.4 Organises and moderates meetings 4.5 Contributes to the efficiency of meetings by being prepared and actively participating 4.6 Keeps client and project members informed about project progress at all stages, especially when the project is not progressing as planned 4.7 Shows initiative to adapt communication styles to the others and the situation at hand 5.9. Sticks to his/her responsibilities 5.10. Approaches others if they do not perform to their responsibilities.		
Compensation: None			
Enrollment:			

Graduation Project

Title of UOS	Graduation Project HMP-MMLS-GP
Degree Programme	Master in Molecular Life Sciences
Target group	Students enrolled in the Master in Molecular Life Sciences programme
Title of UOS	Graduation Project
Name UOS Alluris	HMP-MMLS-GP
Code OSIRIS	
Code Alluris	HMP-MMLS-GP
Registering for educational components	For all education offered after 31 January 2023, students need to register for the educational components they wish to follow. See Part 3 OSIRIS Regulations for Education, Exams and Modular Exams' for more information.
Professional task	<ol style="list-style-type: none"> 1. to understand practical, economic, social and/or ecological needs of businesses, market and society that can be anticipated by biotechnology 2. to apply fundamental knowledge in the area of molecular life sciences to find sustainable solutions for these needs 3. to implement such solutions in a successful and efficient way by organizing their realization in projects, considering the interdisciplinary dimension and communicating with different experts. <p>Such projects have a duration of at least three months.</p>
Professional Products	<ul style="list-style-type: none"> • Project proposal • Scientific Report • Project Portfolio and Review
Credits/ study load	30 EC / 840 study load hours, consisting of approximately 10 contact hours with HAN lecturers 60 hours to write the project proposal, 690 hours project work, including practical work, 60 hours to write the master report and project reflection and 20 hours to prepare the presentation and defence
Relationship with and entry requirements concerning exams	<ul style="list-style-type: none"> • Successful completion of the exam of the unit of study "Fundamentals", "Drug Discovery and Development", "Production of Biomolecules 1 and 2", "Vaccines and Diagnostics" except for one modular exam in one of these modules and submission of MMLS-VAD-VAL PL • Successful completion of the exam of the unit of study "Research and Product Development Skills 1 and 2" and "Managing Projects 1 and 2" except for MMLS-RD2-BP; this must be submitted before starting with the graduation project
General description	<p>The Graduation Project is the final proof of competence of the Master Molecular Life Sciences programme. Students show that they can plan, carry out and manage a project in a self-driven manner, thereby demonstrating all final qualifications of this degree course.</p> <p>The graduation project is anchored in the internship/workplace environment of each student and concerns applied science or product development in life sciences / biotechnology. It comprehends a period of 21 weeks full-time (up to 42 weeks part-time), including project planning and closeout.</p> <p>Students write a complete project proposal and realise the project according to this. They track their project management actions and results and document these in a portfolio. The project is closed out with a scientific report and portfolio assessment.</p>

<p>Competences</p>	<p>Competence 1: Professional conduct and guiding professional development</p> <p>Competence 2: Designing strategies for applied research and product development</p> <p>Competence 3: Design, analysis and control of experiments</p> <p>Competence 4: Communication</p> <p>Competence 5: Managing projects</p> <p>Competence 6: Advising</p>
<p>Assessment criteria</p>	<p><i>The assessment criteria are directly derived from the following final qualifications (see also the exams of the UOS Graduation Project below):</i></p> <p><i>Competence 1: Professional conduct and guiding professional development</i></p> <ol style="list-style-type: none"> 1.1. Shows a professional, pro-active, curious, scientific and entrepreneurial attitude adapts quickly, motivates him/herself, shows initiative, is goal-oriented, and acts honestly and efficiently 1.2. Works efficiently in a team (colleagues, project leader, client) during all phases of the project through open communication and by considering the needs of others. 1.3. Pro-activity contributes to setting up and maintaining a professional network. 1.4. Critically reflects on the project with respect to scientific project management approach and results. 1.5. Critically reflect on the own role in the course of a project. 1.6. Critically reflects on the own personality and how this influences professional conduct. 1.7. Defines personal learning goals (based on project/work requirements) and guides personal development to reach learning goals <p><i>Competence 2: Designing strategies for applied research and product development</i></p> <ol style="list-style-type: none"> 2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; Discriminates between major and side issues 2.2. Combines information from different sources in the context of the own project 2.3. Defines the project aim in terms of products and/or results based on the acquired background information 2.4. Defines the quality requirements for products and processes based on legal requirements. 2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel 2.6. Designs a complete strategy leading to the project aim (project of about 3-4 months; see also: managing projects) 2.7. Identifies opportunities to patent products, results and strategies <p><i>Competence 3: Design, analysis and control of experiments</i></p> <ol style="list-style-type: none"> 3.1. Designs experiments based on the required quality and quantity of the product or result. 3.2. Applies strict logical thinking to draw conclusions from the results and interprets them: <ul style="list-style-type: none"> - in the context of the experiments - in the context of the project aim (helicopter view) - in comparison to other analyses, reference/theoretical values, and quality requirements.

	<p>3.3. Solves practical problems if experiments do not work as planned (trouble shooting); couples back to the theory or consults colleagues if necessary; suggests alternative experiments.</p> <p><i>Competence 4: Communication</i></p> <p>4.1. Reports project plans and results according to the standard format of scientific documents and meets the scientific international conventions criteria</p> <p>4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium</p> <p>4.3. Describes the key message of the project relevant for patenting, registration, and/or business development. Uses terminology that is understandable for experts from different departments</p> <p>4.4. Organises and moderates meetings</p> <p>4.5. Contributes to the efficiency of meetings by being prepared and actively participating</p> <p>4.6. Keeps client and project members informed about project progress at all stages, especially when the project is not progressing as planned</p> <p>4.7. Shows initiative to adapt communication styles to the others and the situation at hand</p> <p><i>Competence 5: Managing projects</i></p> <p>Takes responsibility for a project by:</p> <p>5.1. Defines project deliverables based on the needed quality and quantity</p> <p>5.2. Identifies project risks based on the (experimental) approach and on (putative) competitors</p> <p>5.3. Defines project exclusions</p> <p>5.4. Organizes the project in phases and defines decision points/ milestones</p> <p>5.5. Describes the project organisation including the responsibilities of all project members</p> <p>5.6. Writes a communication plan concerning all project members and parties involved</p> <p>5.7. Describes a schedule based on the (experimental) plan</p> <p>5.8. Describes the required budget</p> <p>5.9. Performs his/her responsibilities</p> <p>5.10. Approaches others if they do not perform to their responsibilities</p> <p>5.11. Sets priorities and works efficiently towards the defined project aim/deliverables</p> <p>5.12. Is in control of the project during all phases by being pro-active if the project does not run according to the plans and initiating an alternative strategy</p> <p>5.13. Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy</p> <p>5.14. Obtains the deliverables in time and with the described resources; if not, reasons and justifies the decisions that have been taken in the course of the project</p> <p><i>Competence 6: Advising</i></p> <p>6.1. Actively involves different specialist to collect advise contributing to the progress of the project.</p> <p>6.2. Actively participates in a discussion about related projects by asking critical questions and suggesting follow-up experiments.</p> <p>6.3. Advises about follow-up projects of the own project.</p> <p>6.4. Integrates own project results in the multidisciplinary defined goals and advises other departments</p> <p>6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources</p>
Exams	<p>See exams of the UOS Graduation Project below this table</p>

Compulsory literature	<ul style="list-style-type: none"> • Graduation project handbook • Specialized literature relevant to the project
Recommended literature	Scientific literature relevant to the specific project
Software and other materials	Dependent on the specific project
Activities	Placement in the professional practice
Work formats	Literature studies, writing project plans and results, controlling experiments, team work, work meetings, managing project and compiling portfolio, project review and discussions
Lesson/ Contact hours	See above: credits/ study load
Education Period	September 2022- August 2023

Exam of the UOS Graduation Project

	Assessment criteria/ Indicators / requirements		
	Competence indicators	Body of Knowledge and Skills	Assessment criteria
Code Alluris: MMLS-GP-PP	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>These competence and knowledge criteria are translated into the following assessment criteria</i>
Code OSIRIS:			
Name modular exam: Project proposal	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; discriminates between major and side issues.</p> <p>2.2. Combines information from different sources in the context of the own project to result in a relevant and comprehensive proposal.</p> <p>2.3. Defines the project aim in terms of products and/or results based on the acquired background information.</p> <p>2.4. Defines the (quality) requirements for products and processes based on customer / legal requirements.</p> <p>2.6. Designs a complete strategy leading to the project aim. (project of about 3-4 months; see also: managing projects)</p> <p>2.7. Identifies opportunities to patent products, results and strategies.</p> <p>3.1. Designs experiments based on the required quality and quantity of the product or result.</p> <p>4.2. Presents project plans and results in English to colleagues, other</p>	<i>Depending on context of the (internship) workplace.</i>	See assessment form 'Graduation Project Proposal' on #OnderwijsOnline – General Information and in the Reader Graduation Project
Type: Individual written professional product			
Number of examiners: 2 for construction and evaluation of assignment and assessment form, 2 for assessment			
Assessment: Grade			
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 20%			

<p>Period and resit: 2 chances per study year; Chance 1: 4 weeks after start Graduation Project Chance 2: 4 weeks after assessment version 1</p>	<p>researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium</p> <p>5.1. Defines project deliverables based on the needed quality and quantity. 5.2. Identifies project risks based on the experimental approach and on (putative) competitors. 5.3. Defines project exclusions. 5.4. Organizes the project in phases and defines decision points. 5.5. Describes the project organisation including the responsibilities of all project members 5.6. Writes a communication plan concerning all project members and parties involved. 5.7. Describes a schedule based on the experimental plan. 5.8. Describes the required budget.</p>					
<p>Compensation: None</p>						
<p>Enrollment:</p>						
<p>Code Alluris: MMLS-GP-REP</p>	<p><i>Competence indicators</i></p>	<p><i>Knowledge indicators</i></p>	<p><i>These competence and knowledge criteria are translated into the following assessment criteria</i></p>			
<p>Code OSIRIS:</p>						
<p>Name modular exam: Report</p>	<p>2.1. Is able to independently acquire knowledge in a new subject by consulting specific literature and other resources; is able to identify reliable and suitable sources; discriminates between major and side issues.</p> <p>2.2. Combines information from different sources in the context of the own project.</p> <p>3.2. Applies strict logical thinking to draw conclusions from the results and</p>	<p><i>Depending on context of the (internship) workplace.</i></p>	<p>See assessment form 'Graduation Scientific Report' on #OnderwijsOnline – General Information and in the Reader Graduation Project</p>			
<p>Type: Individual written professional product</p>						
<p>Number of examiners: 2 for construction and evaluation of assignment and assessment form, 2 for assessment</p>						
<p>Assessment:</p>						

Grade	<p>interprets them in the context of the experiments, in the context of the project aim (helicopter), and in comparison to other analyses, reference/theoretical values and quality requirements.</p> <p>4.1. Reports project plans and results according to the standard format of scientific documents and meets the scientific international conventions criteria.</p> <p>6.3. Advises about follow-up projects.</p>		
Cut-off value: 55%			
Minimal result: 5.5			
Weighting: 25%			
Period and resit: 2 chances per study year; Chance 1: End of Graduation Project Chance 2: 4 weeks after assessment version 1			
Compensation: None			
Enrollment:			
Code Alluris: MMLS-GP-WPA	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>These competence and knowledge criteria are translated into the following assessment criteria</i>
Code OSIRIS:			
Name modular exam: Workplace assessment	<p>1.1. Shows a professional, pro-active, curious, scientific and entrepreneurial attitude: adapts quickly, motivates him/herself, shows initiative, is goal-oriented, and acts honestly and efficiently.</p> <p>1.2. Works efficiently in a team (colleagues, project leader, client) during all phases of the project through open communication and by considering the needs of others.</p>	Depending on context of the (internship) workplace.	See assessment form 'Graduation Workplace assessment' on #OnderwijsOnline – General Information and in the Reader Graduation Project
Type: Individual assessment of professional performance			
Number of examiners: 2 for construction and			

<p>evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor</p>	<p>2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel.</p> <p>3.1. Designs experiments based on the required quality and quantity of the product or result.</p> <p>3.3. Solves practical problems if experiments do not work as planned (trouble shooting). Couples back to the theory or consults colleagues if necessary. Suggests alternative experiments.</p> <p>4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium.</p> <p>4.4. Organises and moderates meetings.</p> <p>4.5. Contributes to the efficiency of meetings by being prepared and actively participating.</p> <p>4.6. Keeps client and project members informed about project progress at all stages, especially when the project is not progressing as planned.</p> <p>4.7. Shows initiative to adapt communication styles to the others and the situation at hand.</p> <p>5.9. Performs his/her responsibilities.</p> <p>5.10. Approaches others if they do not perform their responsibilities.</p>		
<p>Assessment: Grade</p>			
<p>Cut-off value: 55%</p>			
<p>Minimal result: 5.5</p>			
<p>Weighting: 25%</p>			
<p>Period and resit: 2 chances per study year; Chance 1: End of Graduation Project Chance 2: 4 weeks after assessment version 1</p>			
<p>Compensation: None</p> <p>Enrollment:</p>			

	<p>5.11. Sets priorities and works efficiently towards the defined project aim.</p> <p>5.12. Is in control of the project during all phases by being pro-active if the project does not run according to the plans and initiating an alternative strategy.</p> <p>5.13. Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy.</p> <p>5.14. Obtains the deliverables in time and with the described resources; if not, reasons and justifies the decisions that have been taken in the course of the project.</p> <p>6.1. Actively involves different specialist to collect advise contributing to the progress of the project.</p> <p>6.2. Actively participates in a discussion about related projects by asking critical questions and suggesting follow-up experiments.</p> <p>6.4. Integrates own project results in the multidisciplinary defined goals and advises to other departments.</p> <p>6.5. Gives advice about choosing new equipment or methods based on project goals, overall goals and available resources.</p>		
Code Alluris: MMLS-GP-PA	<i>Competence indicators</i>	<i>Knowledge indicators</i>	<i>These competence and knowledge criteria are translated into the following assessment criteria</i>
Code OSIRIS:			
Name modular exam:		Depending on context of the	

<p>Portfolio Assessment</p>	<p>1.3. Pro-actively contributes to setting up and maintaining a professional network.</p>	<p>(internship) workplace.</p>	<p>See assessment form ‘Graduation Portfolio Assessment’ on #OnderwijsOnline – General Information and in the Reader Graduation Project</p>
<p>Type: Individual performance including assignments</p>	<p>1.4. Critically reflects on the project with respect to scientific project management approach and results.</p>		
<p>Number of examiners: 2 for construction and evaluation of criteria, 1-2 for assessment considering advice of workplace supervisor</p>	<p>1.5. Critically reflects on the own role in the course of the project. 1.6. Critically reflects on the own personality and how this influences professional conduct.</p>		
<p>Assessment: Grade</p>	<p>1.7. Defines personal learning goals (based on project/work requirements) and guides personal development to reach learning goals.</p>		
<p>Cut-off value: 55%</p>			
<p>Minimal result: 5.5</p>	<p>2.5. Designs different approaches that could lead to the project aim. Evaluates these possibilities and justifies the choice based on scientific arguments and practical parameters such as time, costs, quality and personnel.</p>		
<p>Weighting: 30%</p>			
<p>Period and resit: 2 chances per study year; Chance 1: End of Graduation Project Chance 2: 4 weeks after assessment version 1</p>	<p>2.7. Identifies opportunities to patent products, results and strategies. 4.2. Presents project plans and results in English to colleagues, other researchers in the field or to clients. The presentation is at a level equivalent to a presentation at an international symposium</p>		
<p>Compensation: None</p>			
<p>Enrollment:</p>	<p>4.3. Describes the key message of the project relevant for patenting, registration, and/or business development. Uses terminology that</p>		

	<p>is understandable for experts from different departments.</p> <p>4.4. Organises and moderates meetings.</p> <p>4.5. Contributes to the efficiency of meetings by being prepared and actively participating.</p> <p>4.6. Keeps client and project members informed about project progress at all stages, especially when the project is not progressing as planned.</p> <p>5.2. Identifies project risks based on the experimental approach and on (putative) competitors.</p> <p>5.4. Organizes the project in phases and defines decision points.</p> <p>5.11. Sets priorities and works efficiently towards the defined project aim.</p> <p>5.13. Is flexible with changing circumstances by adapting the experimental, project and/or communication strategy.</p> <p>5.14. Obtains the deliverables in time and with the described resources; if not, reasons and justifies the decisions that have been taken in the course of the project.</p> <p>6.1. Actively involves different specialists to collect advise contributing to the progress of the project.</p> <p>6.4. Integrates own project results in the multidisciplinary defined goals and advises to other departments.</p>		
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