Implementation Regulations CER HZ

Bachelor

CHEMISTRY

Full-time

CROHO 34396

2023-2024

UNIVERSITY OF APPLIED SCIENCES

INDEX

CHAPTER 1 GENERAL PROVISIONS

1.1 General

1.1.1 The HZ Course and Examination Regulations Bachelor programme full-time (hereinafter: CER HZ) cover the core of education within the HZ. This document provides a general overview of all programmes taught at the HZ. The CER HZ contains institution-specific provisions i.e., those that apply to the entire HZ. A programme-specific CER HZ Implementation Regulation (hereinafter: Implementation Regulation) is determined for each programme by the executive board each year.

1.1.2 The HZ Course and Examination Regulations Bachelor programme full-time applies to this HZ CER Implementation Regulation Bachelor programme full-time.

1.1.3 The Dutch Higher Education and Research Act (WHW) as well as the CER HZ mention study credits. These Implementation Regulations, in addition to the term credits, also refer to ECTS (European Credits Transfer System), where 1 ECTS is equal to 1 credit and thus a study load of 28 hours (article 7.4 paragraph 1 of WHW).

1.2 Establishment and evaluation

1.2.1 The process of establishment and evaluation of this Implementation Regulation is described in article 1.3.4 CER HZ.

1.2.2 The programme committee evaluates the manner of implementation of the education and examination regulations and the Implementation Regulations in question every year (article 1.3 CER HZ).

CHAPTER 2 IMPLEMENTATION REGULATIONS HZ CER

2.1 Registration, prior educational requirements, and admission policy

2.1.1 Overview of additional prior educational requirements (article 2.2 and 2.3 CER HZ)

Students with a havo diploma				
Havo profiles:	**NT**	**NG**	**EM**	**CM**
Admissible:	*Yes*	*Yes*	*No*	*No*

Students with a vwo diploma				
Vwo profiles:	**NT**	**NG**	**EM**	**CM**
Admissible:	*Yes*	*Yes*	*No*	*No*

2.1.1b Enrolment 180 ECTS track for VWO students (article 2.2a CER HZ)

Anyone who wishes to be admitted to a three-year Degree programme must comply with one of the following educational entry requirements:

a. a pre-university education diploma (Dutch: VWO);
   a. Students with a NT and/or NG profile are admissible to the 180 ECTS VWO programme.
   b. International students are admissible to the 180 ECTS VWO programme only if Nuffic has determined that their diploma is equal to the Dutch VWO diploma with a profile comparable with the Dutch NT (e.g. mathematics, chemistry, biology) or NG profile (e.g. chemistry, physics and mathematics).

b. a diploma deemed by ministerial decree to be at least equivalent, or at least equivalent to it in the opinion of the Executive Board. The Executive Board may also decide to admit another person to a three-year Degree programme than the one meant in the first paragraph if, in the opinion of the Executive Board, they have shown they are suitable for that programme.

2.1.2 *Deficiency investigation* (article 2.4 CER HZ)

The holder of a diploma that does not meet the admission requirements (deficiency) (see article 2.1.1) can be admitted on the condition that the requirements for the contents are met by means of a deficiency investigation. The deficiency investigation for the study programme Chemistry is an assessment of the knowledge of and skills in Mathematics (B) and Chemistry at HAVO level. If the candidate is able to prove by means of the assessment that he or she possesses the required knowledge, he or she will be admitted to the study programme. An assessment for deficiency investigation requires a minimal age of 21 years.

2.2 Programme and education structure

2.2.1 ***Programme profile*** (article 3.2 CER HZ)

Study programme profile, according to DAS profile, version 3.1, September 2022.

The main focus of the programme is solving problems or answering questions, either individually or in a group, at the molecular level in the fields of chemistry, pharmacy, nutrition and health, generally by conducting experimental research in a laboratory. The use of advanced and often automated equipment is becoming an important aspect of this. It is clear here that information technology, such as the use of advanced software to simulate and optimise chemical processes and the use of bioinformatics (data mining, gene and protein analyses, genomics, proteomics), is becoming increasingly important.

In the study programme there is a focus on the role and importance of new developments in Biobased Chemistry and Biobased materials. Besides this the students will get familiar with practicals with Biobased sources and materials and learn about developments from oil-based economy to a more sustainable, circular and biobased economy.

Chemistry graduates are characterised by analytical, abstract-reasoning, investigative and service skills. This means that Chemistry graduates do not just ask about the 'what' and the 'how' but also about the 'why'. They consequently focus on gaining the insight that will allow them to achieve new developments. Chemistry graduates are able to work in a multidisciplinary environment. In their work they take into account the risks for people and the environment and base their decisions on the Royal Netherlands Chemical Society's ethics chapter. They work within the legal framework that governs the tasks they are performing and aim for the most sustainable solution possible. Chemistry graduates always follow the guidelines of a quality system, or they apply the Good Laboratory Practice (GLP) rules to their work.

In the laboratory Chemistry graduates might focus on a particular field, for example, a specialisation within the discipline, fundamental or applied research or the development of laboratory techniques. A few years into their careers they might move on to managerial positions such as project manager or head of department or to positions such as quality manager, equipment manager, instructor/supervisor, IT professional and so on. They could also end up working in the education sector, for example as a teacher or supervisor, or in a commercial position in the private sector. An HBO degree in Chemistry also forms a good basis for an academic programme in, for example, chemistry, biomedical sciences, health sciences, molecular/medical biology. Such a programme can generally be taken in an accelerated form at one of the research universities.

2.2.2 ***Learning outcomes*** (article 3.2 CER HZ)

Learning outcomes, according to DAS profile, version 3.1, September 2022.

1 Research Within the Applied Science domain, the Bachelor of Science translates a problem provided into a research strategy and conducts the research.		
1.1	The student performs simple research in response to a problem statement and setup provided.	
	1.1a	Communicating with the client about the problem and the objective of the research
	1.1b	Gaining an insight into the professional aspects of the research by studying the literature or sources provided.
	1.1c	Explaining the relationship between the research question provided, sub-questions and research activities.
	1.1d	Developing an approach to carrying out the research activities of a simple research assignment according to a format provided, including the planning of the work.
	1.1e	Working in accordance with the work plan when carrying out the assignment and finding effective ways of achieving the intended results. Applying basic knowledge or skills.
	1.1f	Summarising the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic.
	1.1g	Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research.
	1.1h	Reporting orally and/or in writing on the assignment in accordance with specified guidelines.
	1.1i	Actively working as part of a team, processing the feedback on the work delivered to achieve better results. Being able to communicate concisely about goals and results as the work progresses.
1.2	The student makes a major contribution to a research strategy provided and conducts the research.	
	1.2a	Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment.
	1.2b	Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected.
	1.2c	Formulating, under supervision, sub-questions and research activities regarding the research to be carried out.
	1.2d	Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions.
	1.2e	Working in accordance with the work plan when carrying out the assignment. Implementing the work plan effectively and efficiently and determining whether interim adjustments are necessary on the basis of interim results. Applying relevant knowledge or skills.
	1.2f	Summarising and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results.
	1.2g	Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps.
	1.2h	Combining the results into one report in accordance with the applicable guidelines/ standard.
	1.2i	Acting as a full team member in the student's working environment, where feedback and reflection lead to better results, reasoned choices and effective coordination in conducting the research. Being able to match communication on progress to the situation.
1.3	The student translates a problem provided into a research strategy and conducts the research.	
	1.3a	Analysing, independently, a problem provided and translating it into the objective of the research assignment.
	1.3b	Selecting and obtaining, without assistance, scientific and other literature or sources in order to study the problem in greater depth, thereby validating the reliability of the different sources of information.
	1.3c	Formulating, without assistance, sub-questions and research activities regarding the research to be carried out.
	1.3d	Preparing a work plan without assistance, taking into account the interdependencies of various research activities and preconditions.
	1.3e	Implementing a complex work plan effectively and efficiently and updating it as necessary in between times. Acquiring relevant knowledge and putting it into practice.

	1.3f	Logically and clearly combining the full or partial results and interpreting them in relation to the research question. Performing an analysis of the reliability of the results.
	1.3g	Using the research results to formulate and interpret conclusions relating to the research question. Making proposals for follow-up research based on the conclusions.
	1.3h	Reporting on the research in accordance with the standard applicable in the professional field.
	1.3i	Acting as a full member and working as part of a team which also contains staff from other professional field(s). Communicating independently about the relevant substantive aspects of the progress.

2 Experimentation The Bachelor of Science sets up experiments under supervision and conducts them unsupervised in a systematic way and obtains reproducible and reliable results.		
2.1	The student conducts an experiment according to the approach/ protocol provided and obtains replicable results.	
	2.1a	Explaining the objective of the experiment.
	2.1b	Explaining the principle of the method and technique provided.
	2.1c	Becoming proficient in the correct handling of the equipment.
	2.1d	Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation.
	2.1e	Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment.
	2.1f	Processing measurement results properly and correctly and estimating whether a result obtained is realistic.
	2.1g	Giving reasons to establish whether the approach to the experiment has been followed correctly.
2.2	The student chooses a suitable protocol, adjusts it as necessary and carries it out.chooses a protocol/approach, adjusts it if necessary, implements it and obtains reproducible and reliable results.	
	2.2a	Choosing an approach and explaining why it is a suitable way of achieving the objective.
	2.2b	Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings.
	2.2c	Becoming so skilled in operating the available equipment that adjusting the settings leads to desired effects.
	2.2d	Preparing a schedule for implementing a protocol/ approach, conducting the experiment and obtaining reproducible results within the specified time and maintaining accurate and clear documentation.
	2.2e	Assessing whether the approach can be implemented according to HSE, ethical and sustainability standards.
	2.2f	Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided.
	2.2g	Giving reasons to establish whether the approach to the experiment requires improvement.
2.3	The student sets up experiments under supervision and conducts them unsupervised in a systematic way and obtains reproducible and reliable results.	
	2.3a	Formulating, without assistance, an approach to achieving the objective of the experiment.
	2.3b	Choosing or developing suitable methods and techniques and anticipating possible experimental problems.
	2.3c	Being capable of learning independently about the possibilities and limitations of the equipment to be used in order to recognise experimental problems and be able to act accordingly.
	2.3d	Preparing a schedule for a number of experiments, conducting them and obtaining reproducible results within the specified time and main- taining accurate and clear documentation.
	2.3e	Assessing the approach and adapting it if necessary in accordance with HSE, ethical and sustainability standards.
	2.3f	Choosing a statistical or other analysis for assessing the reliability and validity of the result obtained.
	2.3g	Making proposals, where necessary, to improve the approach and propose ad- ditional experiments.

4 Management and coordination		
The Bachelor of Science checks the work against the requirements of different management systems.		
4.1	The student checks the work against the requirements of different management systems.	
	4.1a	Demonstrate general knowledge of the context in which relevant management systems are set up.
	4.1b	Comply with the guidelines of relevant management systems by acting appropriately when performing own work.
	4.1c	Communicate about (compliance with) the guidelines of the relevant management systems when carrying out his work.

5 Advice, procurement and sales		
The Bachelor of Science familiarises himself with users' problems and/or requirements within the Applied Science domain.		
5.1	The student familiarises himself with users' problems and/or requirements.	
	5.1a	Listening to the client and repeating the question in your own words.
	5.1b	Describing the provided information about the context.
	5.1c	To use the technical knowledge provided to propose a possible solution.
	5.1d	To motivate the chosen solution for the question.

6 Instruction, supervising, teaching and coaching		
The Bachelor of Science passes his own knowledge and skills, on request, to employees (by demonstrating and explaining) within the Applied Science domain.		
6.1	The student passes his own knowledge and skills, on request, to employees (by demonstrating and explaining).	
	6.1a	Helping to provide fellow employees, students or trainees with instructions/demonstrations with regard to a practical test, etc.
	6.1b	Helping to supervise employees, trainees, students or course participants in the use of methods and equipment, etc.
	6.1c	Explaining things clearly.
	6.1d	Being aware of the importance of continuously developing his expertise.
	6.1e	Providing feedback, on request, on the evaluation/ assessment of the results of instructions, etc.

7 Leadership and managing people		
The Bachelor of Science provides employees with assistance and guidance when asked to do so.		
7.1	The student provides employees with assistance and guidance when asked to do so.	
	7.1a	Showing that he understands the place and role of his part of the organisation (internship/graduation project).
	7.1b	Helping to allocate tasks and work.
	7.1c	Being approachable and accessible for employees, fellow students and lecturers.
	7.1d	Being honest and reliable towards employees, fellow students and lecturers.
	7.1e	Supporting others in their initiatives.
	7.1f	Contributing to staff and progress meetings on the basis of his own work.
	7.1g	Giving a clear and unambiguous explanation or instructions about a task to be performed.
	7.1h	Giving employees an insight into the importance of the constratints of the project.

8 Self-management		
The Bachelor of Science reflects on his own performance and development.		
8.1	The student reflects on his own performance.	
	8.1a	Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy.
	8.1b	Identifying any need to adjust his own performance in the academic environment.
	8.1c	Communicating with others about professional and ethical dilemmas and identifying professional and ethical dilemmas.
	8.1d	Seeking information in order to improve his own performance.
	8.1e	Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.
8.2	The student reflects on his own performance and development.	
	8.2a	Determining his own learning objective and learning strategy in consultation/without assistance and reflecting on the result.
	8.2b	Using feedback on his own performance to adapt to the working environment.
	8.2c	Taking note of any professional and ethical dilemmas and giving his opinion on them.
	8.2d	Taking on board criticism of work delivered and discussing his own performance with colleagues.
	8.2e	Drawing conclusions on his actions and if necessary articulating them to others.

2.2.3 ***Programme structure*** (article 3.3 CER HZ)

National name:	B Chemie
International name:	B Chemistry
Orientation:	Bachelor
Title conferred:	Bachelor of Science (B.Sc.)
Programme duration:	240 study credits (EC)
Course workload 'propaedeutic' phase:	60 study credits (EC)
Conclusion with 'propaedeutic' examination:	Yes
Course workload main phase:	180 study credits (EC)
Variant:	Full-time
ISAT code:	34396
Location:	Middelburg
Language:	Dutch and English
Effective date:	30-11-2017
Submission date	01-05-2023
Joint degree programme:	Not applicable
180 ECTS fast track:	Yes

*2.2.3a **Programme schedule***

Programme regular track 240 EC

Note

S:	semester	Block:	½ semester (= quarter)
AC:	Applied Chemistry	LS:	Life Science

Semester	Study programme component	Course code	EC	Title
S1	Block 01 Food Chemistry	CU20623V2	5.00	Beer Chemistry
		CU20624V1	5.00	Chemistry 1 and Microbiology 1
		CU76012V1	2.50	Mathematics 1
S1	Block 02 Quality Control	CU20626V2	5.00	Pool Chemistry
		CU20627V1	5.00	Chemistry 2 and Microbiology 2
		CU76013	2.50	Physics
		CU76014	2.50	Quality & Safety
		CU20637V1	1.25	Professionalization block 1 & 2
S2	Block 03 Biobased Products & Technology	CU20629V2	5.00	Bioproduct Extraction & Analysis
		CU20630V1	5.00	Organic Chemistry 1 & Cell biology 1
		CU20631V2	2.50	Biobased Products & Materials
S2	Block 04 Health & Chemistry	CU20632V2	5.00	Biologically Active Compounds
		CU20633V1	5.00	Organic Chemistry 2 & Cell biology 2
		CU76016	2.50	Mathematics 2
		CU76015	2.50	Data analysis 1
		CU20638V1	1.25	Professionalization block 3 & 4
S1/S2	Free Composition Course	CH-HZP-YEAR1-22	2.5	HZ Personality year 1
S3	Block 05 Environmental Chemistry & Toxicology	CU24063V1	5.00	Environmental Chemistry & Toxicology
		CU24064	5.00	Spectroscopy 1 & Toxicology
		CU76018	1.25	Data analysis 2
		CU76022V1	1.25	Student assistant
S3	Block 06 Bio-organic Toolbox	CU24067V1	5.00	Bio-organic Toolbox
		CU24068	5.00	Organic chemistry 3 and Biochemistry 1
		CU76019	3.75	Spectroscopy 2
		CU24070	1.25	Professionalization block 5 & 6
S4	Block 07 Forensic Science	CU24074V1	5.00	Forensic Science
		CU24075	5.00	Spectroscopy 3 / Separations1 & DNA 1
		CU76021	1.25	Data analysis 3
S4	Block 08 Marine Biobased Chemistry	CU24077V1	5.00	Marine Biobased Chemistry
		CU24078	5.00	Research cycle / Separations 2 & Biochemistry 2
		CU76023V1	2.50	Labmanagement & Safety
		CU24080	1.25	Professionalization block 7 & 8
S3/S4	Free Composition Course	CH-HZP-YEAR2-22	2.5	HZ Personality year 2
S3/S4	English(*)	EN39001	5.00	English - Foundation Course B1
		EN39002	5.00	English - Foundation Course B2
		EN39003	5.00	English - Foundation Course C1
		EN39004	5.00	English - Foundation Course C2
S5 - AC	Block 09 Specialisation Applied Chemistry I	CU76000V1	5.0	Chromatography practice
		CU76001V1	5.0	Polymer chemistry & analysis
		CU76002	2.5	Circular Chemistry
S5 - LS	Block 09 From Molecules & Cells to Human Health	CU76003V1	5.0	Immunology practice
		CU76004	5.0	Immunology 1 & Biochemistry 3
		CU13416V6	2.5	Biotechnology
S5 - AC	Block 10 Specialisation Applied Chemistry II	CU76006V1	5.0	Circular Chemistry practice
		CU76007	5.0	Advanced Chromatography
		CU76008	2.5	Circular chemistry & Biopolymers
S5 - LS	Block 10 Achievements & Challenges of Life Science	CU76009V1	5.0	Molecular Biology toolbox
		CU76010	5.0	Immunology 2 & DNA 2
		CU13415V6	2.5	Bioinformatics
S5	Block 10 Achievements & Challenges of Life Science	CU13633V5	2.5	Professionalization block 9 &10
S5/S6	Free Composition Course	CH-HZP-YEAR3-22	2.5	HZ Personality year 3
S6 or S7	Minor	CU05600V12	30.0	Research minor
S6 or S7	Internship	CU06725V18	27.5	Internship in company
S7/S8	Free Composition Course	CH-HZP-YEAR4-22	2.5	HZ Personality year 4
S8	Final thesis	CU06726V16	30.0	Final Thesis & project

(*) A student will follow at least one of the Foundation courses English: B1, B2, C1 or C2 level.

Programme short track 180 EC
See programme regular track 240 EC, semester 3 to 8. Semester 3 and 4 is the propaedeutic level.

Regular and alternative programme mainphase
In the regular programme, the minor is programmed in the 6th semester and the internship in company in the 7th semester. In the alternative programme, the internship in company is programmed in the 6th semester and the minor in the 7th semester.

2.2.3b ***Transfer with an associate degree certificate*** (article 3.3 CER HZ)

Not applicable.

2.2.4 ***Courses propaedeutic phase*** (article 3.5 CER HZ)
See appendix 1.
Lessons and tests of the theoretical part will take place in two separate groups, Dutch and English.
As an exception, collective meetings will be organized (in English), for instance by guest speakers. When the maximum number of students in the international class has not been exceeded, Dutch students are allowed to follow classes in English on a voluntary basis.

2.2.5 ***Main phase courses*** (article 3.6 CER HZ)
See appendix 2.
The language of instruction and examining is English, with the exception of the work placement / graduation phase at the request of the work placement company / company where the student completes his graduation.

The 180 ECTS track is a full English language program, with the exception of the work placement / graduation phase at the request of the work placement company / company where the student completes his graduation.

2.2.6 ***HZ Personality*** (article 3.11 CER HZ)
The curriculum reserves 10 study credits (ECTS) for HZ Personality. HZ Personality is spread over the curriculum as much as possible. With this learning pathway, HZ gives students space to personalize their own development during their studies, increases the possibilities for domain-transcending exploration and stimulates broad social engagement.

Cohort 2021-2022, 2022-2023 en 2023-2024
See policy HZ Personality published on www.hz.nl.
For each activity, an accompanying Personal Development Plan is mandatory, as described at the HZ.learn page of Chemistry and with support of the Study Coach.

Transition arrangement Cohort 2020-2021 and before
Students can choose activities of the following categories:

Category	Course code	Credits
1 Management activities	VCCU76011-1	1.25
	VCCU76011-2	1.25
2 Information & promotion activities	VCCU76012-1	1.25
	VCCU76012-2	1.25
3 Social & cultural activities	VCCU76013-1	1.25
	VCCU76013-2	1.25
4 Coaching activities	VCCU76014-1	1.25
	VCCU76014-2	1.25
5 Project activities	VCCU76015-1	1.25
	VCCU76015-2	1.25
6 Training activities and courses	VCCU76016-1	1.25
	VCCU76016-2	1.25

Additional restrictions:
There is a maximum of 2.5 EC to be done within one single category.
For each activity, an accompanying Personal Development Plan is mandatory, as described at the HZ.learn page of Chemistry and with support of the Study Coach.

2.2.7 ***Specialisations*** (article 3.9 CER HZ)

The Chemistry programme offers the following specializations:

- Applied Chemistry
- Life Sciences

Students choose one of these specialisations by delivering a motivational letter. For additional information see programme descriptions. These can be found on the HZ website and are available from the Academy Office.

2.2.8 ***Internship*** (article 3.8 CER HZ)

To take part in an internship that is part of a bachelor programme with a studyload of 240 credits, the student must have passed the propaedeutic phase and at least 30 credits in the main phase. To participate in an internship that is part of bachelors with a 180 credits study load (accelerated track), the student must have completed the propaedeutic phase or at least 60 credits in total. If the student does not meet these and/or any additional participation requirements but can present special circumstances, the examination board may decide to grant permission to participate in the minor after all.

For information on the graduation/graduation internship, securing an internship and its assessment, please refer to 'Graduation' in the general student manual and in the programme-specific student manual. These can be found on the Chemistry HZ Learn page.

2.2.9 ***Minor*** (article 3.7 CER HZ)

See article 2.2.3a of this regulation.

2.2.10 ***Participation in international exchange programme*** (article 4.5 CER HZ)

Exchange programme is provided via International office (Article 4.5 CER HZ)

Exchange programme is provided via 'Kies op maat' minorships.

2.2.11 ***Graduation*** (article 3.8 CER HZ)

In order to participate in the graduation phase of the Chemistry programme (semester 8), the student has to have no more than 10 ECTS unpassed, besides the 30 ECTS of the graduation phase. The actual graduation manual is applicable for each student, starting a graduation.

For information on the graduation/graduation internship, securing an internship and its assessment, please refer to 'Graduation' in the general student manual and in the programme-specific student manual. These can be found on the Chemistry HZ Learn page.

2.2.12 ***Assessments and inspection of results*** (article 6.1-6.7 CER HZ)

HZ uses seven assessment types that are defined in the HZ Assessment Policy, namely:

- *Written knowledge test*; set of questions focused on knowledge reproduction and/or knowledge application, which are answered in writing.
- *Oral assessment*; set of questions about knowledge (application), which are answered orally.
- *Assignment*; representation of a performed (professional) task.
- *Presentation*; explanation or explanation before an audience of a performed (professional) task.
- *Portfolio*; collection of evidence of competence provided by the student.
- *Criterion-referenced interview*; discussion between assessor and student based on evidence provided in advance, using predefined criteria.
- *(Workplace) Assessment*; performance of (professional) tasks and/or skills (in an authentic context).

The Examination Board's fraud regulations and testing protocols apply to the taking of tests, see MyHZ.

The examiner ensures that the result of a test is registered in Osiris student (article 6.6 of the CER HZ) within 10 working days after the student has taken the test and at least 5 working days before the next possibility for resit.

The student has the right to inspect the assignments/questions, their elaborations and the assessment criteria of the test taken by the student within 10 working days after the date on which the result of the test was announced, or as much earlier as is necessary in connection with the next possibility of resitting the test (article 6.4 and article 6.6 of the CER HZ).

2.2.13 ***Transition arrangement*** (article 6.7 CER HZ)
Transition arrangement implementation HZ Personality. See article 2.2.6.

2.3 Study recommendation

2.3.1. ***Conditions for registration for programme after NBSA*** (article 8.1, paragraph 9 HZ CER)
The student who has received a negative binding study recommendation cannot be enrolled in the bachelor degree programme Chemistry for a period of three years after deregistration (see HZ CER chapter 8).

2.4 Registering for courses and tests

2.4.1 The student registers for **courses** through OSIRIS Student (CER HZ article 4.4 paragraph 3).

- The student will be informed about course registration by email no later than 2 weeks before the start of the study year.
- New students will be registered by the study programme for the courses of block 1 in their first year at HZ.
- To participate in the course, you must be enrolled no later than one week before the start.
- Once the student is enrolled, the student will also see this in the timetable.
- If a student decides not to take a course, the student contacts the SLC early.

2.4.2 Students register and de-register for tests through OSIRIS Student. Registration applies to all types of tests and all tests within a course. HZ works with registering for tests so that courses can organize the work for taking and assessing tests (OER article 6.3 paragraph 1).

- Students are informed centrally in week 1 of each block via an email by the domain offices about registering for tests.
- New students are enrolled by the program for the first two test occasions or guided therein by the program for tests of block 1 year 1.
- Students must register for all tests in the block in which the tests are offered no later than the second week of classes (Sunday 23:59h, GMT+1). With registration before the deadline, the student is guaranteed to participate in the tests.
- After registering, the student may decide not to take the test after all. In that case, the student deregisters himself/herself in OSIRIS Student again for the test opportunity. This can be done at any time, except if the student has participated in the test. *Note! A student is entitled to two test attempts per academic year, unless the examination committee decides otherwise (CER article 6.2). Articles 2.2.4 and 2.2.5 of the Implementation Regulations state for each test how many test opportunities are offered in the academic year.*
- If a student has not registered before the deadline for a test opportunity in which the student does want to participate, the student contacts the study coach (SLC)
- The student checks in week 6 of each block whether the test opportunity is in the timetable. If, after registration, the test is not in the timetable, the student contacts the domain office.
- When a student is registered for a test and has not participated, Not Participated (NP) is entered as a result in OSIRIS.
- Procedure for registration practical exercise:
    - The student must register with the *Registration form resit practical exercise* on Learn.

- The student can only register for the practical exercise that is taken in the same block.
- The student must register no later than the eight block week (Sunday 23:59h) of the block in which the practical exercise is offered.
- The resit of the practical exercise will be scheduled in the tenth block week of the same block.

2.4.3 More information about OSIRIS Student can be found on https://learn.hz.nl/course/view.php?id=14505.

CHAPTER 3 ESTABLISHMENT

3.1.1 The duration of the implementation regulations is the same as the duration of the HZ Course and Examination Regulations Bachelor programme full-time 2023-2024.

3.1.2 The study program committee has approved this implementation regulation on 06/04/2023.

3.1.3 These Course and Examination Regulations were established by the Executive Board on 04/07/2023.

Appendix 1 – Course propaedeutic phase

Block 1 Food chemistry

Block / Semester: S1					
CU20623V2	**Title: Beer Chemistry**				
Course information					
Amount of study credits: 5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercises is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: Together as a learning team you are going to brew beer. You can choose between two kinds of beers, i.e. a black gold and a white beer. After the brewing process, which takes two weeks, you will bottle the beer and store it and subsequently perform various chemical and microbiological analysis. The course will be completed by a beer brewing contest. Besides beer brewing we provide you with the most important practice of your career in chemistry: how to work in a safe way, how to perform a weighing on an (analytical) balance and how to transfer volumes within a certain precision. In addition you are introduced to titration techniques and the use of primary and secondary standards. By titration you will determine the alcohol content of your own brewed beer. Furthermore you will be learned how to use a spectrophotometer to determine the colour unit of your beer. You will learn various ways to identify and count microorganisms, i.e. by prepare a growth medium and via inoculation making a pure culture. In addition you will perform fermentation tests. During the practical's you report all observations and obtained data in your lab journal according the guidelines and you will be learned how to keep up a laboratory journal. During most practical's you work in couples and is communication essential to be successful. The teacher will motivate you to communicate and to approach.					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	(Workplace) Assessment	Individual workplace assessment	100%	5.5	B1.9, B2.9
Practical exercise					
PRAKT-OEF (VT)	Practical exercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU20624V1	**Title: Chemistry 1 and Microbiology 1**

Course information

Amount of study credits:	**Language:**
5	English Dutch

Conditions for course participation:
None.

Conditions for test participation:
None.

Brief description of course content:
Che1
Basic concepts of (mainly) inorganic chemistry and physical chemistry are explored. The main topics are: the scientific method, atomic model, chemical bonding (Lewis structures), the periodic table of the elements and stoichiometry.

Mic1
Basic microbiological concepts and techniques are taught in context of food sciences. Understanding of microbial physiology is key in fully comprehending the relationship between microbes and food.

Course learning outcomes:
TOETS01 (Che1)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

TOETS02 (Mic1)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

Compulsory literature:
Brock Biology of Microorganisms, Global Edition, Madigan, M. Bender, K. Buckley, Daniel Sattley, Matthew Stahl, David, 16th edition, ISBN: 9781292404943
Chemistry, Robinson, McMurry, Fay, 8th edition, ISBN: 9781292336145
Biology: A Global Approach plus Pearson MasteringBiology with Pearson eText, Global Edition, Campbell, Neil, 12th edition, ISBN: 9781292345864

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Che1 - Written exam	50%	5.5	B1.9, B2.10
TOETS02 (VT)	Written knowledge test	Mic1 - Written exam	50%	5.5	B1.9, B2.10

Block / Semester: S1					
CU76012V1	**Title: Mathematics 1**				
Course information					
Amount of study credits: 2.5			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Elementary mathematics: expanding forms (removing brackets), factorising forms. Basic algebra: Understanding and solving linear, quadratic and exponential (the number e, logarithms) equations. Solving systems of equations. Basic trigonometry: definition of sine and cosine and he use of the unit circle. The course will be relying on self-study in the online environment of Sowiso. A weekly Q&A session will be planned at HZ for support.					
Course learning outcomes: 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Mathematics 1 - Written exam	100%	5.5	B1.9, B2.10

Block 2 Quality Control

Block / Semester: S1					
CU20626V2	**Title: Pool chemistry**				
Course information					
Amount of study credits: 5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: Maybe you have visited a swimming pool many times, but do you know how swimmers pollute their own swimming water? Think about "pee in the pool", perfumes, sweat, body lotion. In this course you will monitoring the chemical and microbiological parameters of a local swimming pool. Questions as how do they react with chlorine, how do these products affects our health and which kind of bacteria in swimming pools can cause serious health effects will be studied.					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	(Workplace) Assessment	Individual workplace assessment	100%	5.5	B2.9, B3.9
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU20627V1	**Title: Chemistry 2 and Microbiology 2**

Course information

Amount of study credits:	**Language:**
5	English Dutch

Conditions for course participation:

None.

Conditions for test participation:

None.

Brief description of course content:

Basic microbiological concepts are taught in relation to water quality and hygiene. The course focuses on infectious diseases, diagnostic detection, prevention, and treatment.
Basic chemistry concepts are taught in relation to water quality and hygiene. The course focuses on chemical equilibriums and the aqueous equilibria which they will apply in the practical course. Other concepts are the covalent and ionic bonding and the basics of thermochemistry (internal energy, enthalpy, entropy, Gibbs energy).

Course learning outcomes:

TOETS01 (Che2)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and main-taining accurate and clear documentation.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

TOETS02 (Mic2)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

Compulsory literature:

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Chemistry 2 - Written exam	50%	5.5	B2.8, B2.10
TOETS02 (VT)	Written knowledge test	Microbiology 2 - Written exam	50%	5.5	B2.8, B2.10

Block / Semester: S1					
CU76013	**Title: Physics**				
Course information					
Amount of study credits: 2.5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: In order to understand equipment in the laboratory we teach about light. We begin with harmonic oscillation and waves. Other topics: Light as a(n electromagnetic) wave, Snel's Law, Lenses and microscope, Lambert-Beer's Law and Polarisation. Electrostatics: understand what is an electrical field and electrical tension (voltage) and Coulomb' s Law. Useful to understand molecular models. Electrical currents: Ohm's law. Serial and parallel circuits. The difference between current and voltage. Electrical power. Magnetism: The Lorentz Force. Bending of charged particles in a magnetic field. The magnetic induction of a coil and a wire.					
Course learning outcomes: 2.1b Explaining the principle of the method and technique provided. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Physics - Written exam	100%	5.5	B2.8, B2.10

Block / Semester: S1					
CU20637V1	**Title: Professionalization block 1 & 2**				
Course information					
Amount of study credits: 1.25			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Assignments, individual and as a group to work on personal professional skills and knowledge of the students competencies to develop toward a professional chemistry employee.					
Course learning outcomes: 1.1i Actively working as part of a team, processing the feedback on the work delivered to achieve better results. Being able to communicate concisely about goals and results as the work progresses. 8.1a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.1b Identifying any need to adjust his own performance in the academic environment. 8.1d Seeking information in order to improve his own performance. 8.1e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B2.9, B2.10

Block / Semester: S1					
CU76014	**Title: Quality & Safety**				
Course information					
Amount of study credits: 2.5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: Passed the theoretical safety exam.					
Brief description of course content: Before you can carry out an experiment in a lab, you will need to ask yourself two important questions: (1) How do I ensure that the experiment is conducted safely (people and environment)? (2) How do I ensure that my results are reliable?					
Course learning outcomes: 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature: Managing safety, health and environmental risks in laboratories, Ir. Iris van 't Leven, 2nd edition, ISBN: 9789491764530					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	(Workplace) Assessment	Individual practical exam	100%	5.5	B2.7, B2.10

Block 3 Biobased Products & Technology

Block / Semester: S2					
CU20629V2	**Title: Bioproduct Extraction & Analysis**				
Course information					
Amount of study credits: 5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: Did you wonder how long this planet can provide for fossil fuels? What other sources are available? Which role do chemists have in this particular topic? In this course you will get familiar with chemical techniques for distillation, synthesizing biochemical compounds, alternatives for fuel, yield and other bio based related chemical methods. 3 methods will be practiced: synthesizing, extraction and conversion of chemical compounds. A strong focus will be held on safety, lab preparation and accuracy of work. Workplace assessment will focus on prelabs, use of labjournal, understanding goals and teamwork attitude. An assessment form will be provided beforehand.					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly. 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B3.9, B4.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S2	
CU20630V1	**Title: Organic Chemistry 1 & Cell Biology 1**

Course information

Amount of study credits:	**Language:**
5	English Dutch

Conditions for course participation:
None.

Conditions for test participation:
None.

Brief description of course content:

Organic Chemistry 1. A large component of this course is organic chemistry. This field is of a major importance , since it is the basis of combinations/reactions between chemicals and leading to the existence of new chemicals. Organic chemistry is related to all fields of chemistry such as: food, environment, pharmaceuticals but also petroleum industry. Biochemistry, on the other hand, relates the organic chemistry to biological components. When thinking of Biochemistry , you may think of: fatty acids, (bio) oils, enzymes, amino acids present in chemical drop-ins used in diverse industries.
This course is a theoretical component of the (practical) course CU20629, adding depth to your organic chemistry knowledge, learned previously about: industrial distillation of fossil fuels; naming structures according to IUPAC regulations, chemical bonding in organic molecules. Functional group reactivity is explorer starting with electrophilic addition to alkenes and alkynes.

Cell Biology 1. The main focus areas of this course in relation to the theme of block 3 are Biotechnology and Biological Molecules & Structures.
Biotechnology aims to use living cells and products thereof for human benefit. Biotechnology, in fact, has been used by mankind for thousands of years for a variety of agricultural, food, and medicinal purposes; involving ancient practices, such as the domestication of animals and selective breeding of cultivars, and modern applications, which skyrocketed the last decades. Modern biotechnology has a strong foundation based on DNA technology, such as cloning and expression of certain target genes. To this end, you will learn more about the organization of genes and genomes in organisms, and the central dogma of molecular biology (follow-up on theory of Microbiology 2).
The Biological Molecules & Structures part explores which valuable resources can be extracted from cells. Therefore, you will study the basic chemistry of cells and cellular structures, including various organelles, extracellular components, and membranes (follow-up on theory of Microbiology 1).

Course learning outcomes:

TOETS01 (Org1)
2.1b By explaining, when asked, the principle of the method used
2.1f Processing measurement results properly and correctly and assessing whether a result obtained is realistic
2.1h Making a proposal if necessary to improve the performance of a protocol

TOETS02 (Bio1)
1.1b Gaining an insight into the professional aspects of the research by studying the literature or sources provided.
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.

Compulsory literature:
Organic Chemistry, Global Edition, Bruice, Paula Yurkanis, 8th edition, ISBN: 9781292160344

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Organic Chemistry 1 - Written exam	50%	5.5	B3.8, B3.10
TOETS02 (VT)	Written knowledge test	Cell biology 1 - Written exam	50%	5.5	B3.8, B3.10

Block / Semester: S2					
CU20631V2	**Title: Biobased Products & Materials**				
Course information					
Amount of study credits: 2.5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Everybody is talking about sustainability. But what does sustainability actually mean? This course will try to give an answer. It will also illustrate how biobased products and the bioeconomy can help to tackle the problems our planet is facing. But also which challenges the bioeconomy is facing to do so. In the end you will see the biobased future of the chemical industry which part you might become.					
Course learning outcomes: 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 8.1c Communicating with others about professional and ethical dilemmas and identifying professional and ethical dilemmas.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Biobased P&E - Written exam	100%	5.5	B3.8, B3.10

Block 4 Health & Chemistry

Block / Semester: S2					
CU20632V2	**Title: Biologically Active Compounds**				
Course information					
Amount of study credits: 5			**Language:** English Dutch		
Conditions for course participation:					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: The course focuses on the synthesis and purification of biologically active compounds. They are subsequently tested for their activity in several bioassays.					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly. 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B4.9, B4.12
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S2					
CU20633V1	**Title: Organic Chemistry 2 & Cell biology 2**				
Course information					
Amount of study credits: 5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Key aspects in relation to diseases are discussed in the cell biology part; cell cycle (de)regulation, cancer, meiosis, development, and nerve system. The journey through organic chemistry in commenced with the concept of electron delocalization and resonance structures, reactions of alkyl halides, alcohols, epoxides and ethers. The concept of stereochemistry is also explored.					
Course learning outcomes: TOETS01 (Org2) 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. TOETS02 (Bio2) 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Organic Chemistry 2 - Written exam	50%	5.5	B4.8, B4.10
TOETS02 (VT)	Written knowledge test	Cell Biology 2 - Written exam	50%	5.5	B4.8, B4.10

Block / Semester: S2					
CU76015	**Title: Data analysis 1**				
Course information					
Amount of study credits: 2.5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Before you can carry out an experiment in a lab, you will need to ask yourself two important questions: (1) How do I ensure that the experiment is conducted safely (people and environment)? (2) How do I ensure that my results are reliable? One of the essential tools to give evidence that your results are reliable is statistics. In this course you will process your laboratory data with the help of a spreadsheet program. Major topics: measures of location and spread (mean standard deviation, variance), normal distributions (samples and populations), confidence limits and intervals, principles of significance testing (one-sided and two-sided), applications of the t-test for comparing means, F-test for comparing variances, testing for outliers and the chi-squared test.					
Course learning outcomes: 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Data analysis 1 - Written exam	100%	5.5	B4.8, B4.10

Block / Semester: S2					
CU76016	**Title: Mathematics 2**				
Course information					
Amount of study credits: 2.5			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Introduction to differentiation and integration. Part 1: Differentiation: More theory about functions (inverse functions etc), Limits, The first derivative as an limit and as the slope a of a tangent line, Finding the equation of a tangent line, Finding extreme values of a function and Second derivative of a function and inflection points. Part 2: Integration: Integration as the area under a graph, Integral without borders as reverse of differentiation, Integration with substitution and Partial integration.					
Course learning outcomes: 2.1b Explaining the principle of the method and technique provided. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Mathematics 2 - Written exam	100%	5.5	B4.8, B4.10

Block / Semester: S2					
CU20638V1	**Title: Professionalization block 3 & 4**				
Course information					
Amount of study credits: 1.25			**Language:** English Dutch		
Conditions for course participation: None.					
Conditions for test participation:					
Brief description of course content: Assignments, individual and as a group to work on personal professional skills and knowledge of the students competencies to develop toward a professional chemistry employee.					
Course learning outcomes: 8.1a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.1b Identifying any need to adjust his own performance in the academic environment. 8.1d Seeking information in order to improve his own performance. 8.1e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B4.9, B4.12

Free Composition Course

Block / Semester: S1 **Block / Semester: S2**					
CH-HZP-YEAR1-22	**Title: HZ Personality year 1**				
Course information					
Amount of study credits: 2.5			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Within HZ Personality you will work on skills that you think are important for your personal and professional development. You design the programme yourself and reflect on the approach you have chosen, and the insights obtained. Your study career coach will guide you in this. HZ Personality has three connected levels: you, others, the world. During your study time at HZ you will have to work at least one time on each of these levels in order to broaden your view and experiences on every level. The levels are translated into three themes:Personal development, Community development and Sustainable development					
Course learning outcomes: Developing skills and attitudes to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals and community goals.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Self-reflection & burden of proof	100%	-	Not applicable

Appendix 2 – Course main phase

Block 5 Environmental Chemistry

Block / Semester: S1					
CU24063V1	**Title: Environmental Chemistry & Toxicology**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation:					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: The course focuses on the chemical and toxicological aspects of water quality. Water quality of effluent is monitored of a waste water treatment plant. Parameters such as phosphate, total nitrogen (Khjeldahl method), Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) are monitored. Heavy metals such as lead and copper are measured in the residual product from the sludge fermentation. Besides, the effect of toxic metals is studied with various species as algae, bacteria and micro invertebrate (Artemia). Instrumental techniques as Atomic Absorption Spectroscopy (AAS), steam distillation and microwave destruction are introduced.					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly. 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1e Working in accordance with the work plan when carrying out the assignment and finding effective ways of achieving the intended results. Applying basic knowledge or skills. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B1.9, B2.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU24064	**Title: Spectroscopy 1 & Toxicology**

Course information

Amount of study credits:	**Language:**
5	English

Conditions for course participation:
None.

Conditions for test participation:
None.

Brief description of course content:
The toxicology part addresses the interactions between toxicants and organisms at different levels; ecological, organismal, cellular, and molecular. Important topics include dose-response effects, organ dysfunction, ecology, heavy metals, pesticides, carcinogenesis, genetic alterations, and biotransformation. The water treatment has as goal to help you learn how to prepare and study for the practical. Self-study and co-operation is very relevant here, this part is in relation to the practical Environmental Chemistry & Toxicology . Spectroscopy 1 covers (among others) techniques used in the practical Environmental Chemistry & Toxicology. It has as goal to help you understand the steps involved in method development of the existed protocols. Reading of NEN and ISO norms as well as other materials is of a relevant part.

Course learning outcomes:
TOETS01 (Spe1)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

TOETS02 (Tox)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

Compulsory literature:
Quantitative Chemical Analysis, Harris, Daniel C, 10th edition, ISBN: 9781319324506
Casarett & Doull's Essentials Of Toxicology, Curtis D. Klaassen, John B. Watkins, 3rd edition, ISBN: 9780071847087

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Spectroscopy 1 - Written exam	50%	5.5	B1.9, B2.10
TOETS02 (VT)	Written knowledge test	Toxicology - Written exam	50%	5.5	B1.9, B2.10

Block / Semester: S1					
CU76018	**Title: Data analysis 2**				
Course information					
Amount of study credits: 1.25			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course is a follow-up course of data analysis 1 and focus on the calibration methods in instrumental analysis: regression and correlation. Major topics of this course are correlation coefficient, errors and confidence limits in linear calibration, limits of detection, standard addition, weighted regression and outliers in regression.					
Course learning outcomes: 1.2f Summarizing and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 2.2f Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Data analysis 2 - Written exam	100%	5.5	B1.9, B2.10

Block / Semester: S1					
CU76022V1	**Title: Student assistant**				
Course information					
Amount of study credits: 1.25			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: The student assistant supports the educational process of first and year students and secondary school pupils. He develops tests and practical's and takes care of the necessary materials. The student assistant assists the teacher during the practical. He instructs and supervises individual students, secondary school pupils and learning teams. The student assistant uses his specific knowledge and experience in the fields of Applied Chemistry and Life Sciences as well as general (laboratory) technology. The student assistant can demonstrate and perform experiments and practicals and deal with software and equipment. The student assistant applies safety regulations and maintains them. The activities are performed within the walls of HZ University.					
Course learning outcomes: 6.1a Helping to provide fellow employees, students or trainees with instructions/demonstrations with regard to a practical test, etc. 6.1b Helping to supervise employees, trainees, students or course participants in the use of methods and equipment, etc. 6.1c Explaining things clearly. 6.1d Being aware of the importance of continuously developing his expertise. 6.1e Providing feedback, on request, on the evaluation/ assessment of the results of instructions, etc.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Student assistant - Reflection	100%	5.5	Not applicable

Block 6 Bio-organic Toolbox

Block / Semester: S1					
CU24067V1	**Title: Bio-organic toolbox**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: This course highlights several common laboratory techniques in organic synthesis and biochemical processes, such as electrophoresis, protein-extraction, starch-isolation, steam distillation, TLC, Grignard reactions, purification techniques and analytical techniques (IR spectroscopy).					
Course learning outcomes: 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly. 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1e Working in accordance with the work plan when carrying out the assignment and finding effective ways of achieving the intended results. Applying basic knowledge or skills. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B2.9, B3.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU24068	**Title: Organic chemistry 3 and Biochemistry 1**

Course information

Amount of study credits:	**Language:**
5	English

Conditions for course participation:

None.

Conditions for test participation:

Brief description of course content:

The course provides the necessary theoretical knowledge for the practical (CU24067). The organic chemistry part is a continuation of the organic chemistry of courses CU20630 and CU20633. Topics: organometals, reactions of benzene and benzene derivatives and carbonyl chemistry.
Biochemistry topics: Properties polysaccharides, properties proteins, enzyme kinetics.

Course learning outcomes:

TOETS01 (Org3)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

TOETS02 (Bch1)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

Compulsory literature:

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Organic Chemistry 3 - Written exam	50%	5.5	B2.8, B2.10
TOETS02 (VT)	Written knowledge test	Biochemistry 1 - Written exam	50%	5.5	B2.8, B2.10

Block / Semester: S1					
CU76019	**Title: Spectroscopy 2**				
Course information					
Amount of study credits: 3.75			**Language:** English		
Conditions for course participation:					
Conditions for test participation:					
Brief description of course content: The theory behind spectroscopic techniques (MS, IR and NMR) are explained. Exercises involve structure determination by assessing simulated spectra.					
Course learning outcomes: 2.1b Explaining the principle of the method and technique provided. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Spectroscopy 2 - Written exam	100%	5.5	B2.8, B2.10

Block / Semester: S1					
CU24070	**Title: Professionalization block 5 & 6**				
Course information					
Amount of study credits: 1.25			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Assignments, individual and as a group to work on personal professional skills and knowledge of the students competencies to develop toward a professional chemistry employee.					
Course learning outcomes: 8.1a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.1b Identifying any need to adjust his own performance in the academic environment. 8.1d Seeking information in order to improve his own performance. 8.1e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B2.9, B2.10

Block 7 Forensic Science

Block / Semester: S2					
CU24074V1	**Title: Forensic Science**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: Forensic science is the use of science to investigate crime and present unbiased scientific evidence in court. Forensic scientists draw knowledge form chemistry, biology and physics to recognize, identify and evaluate physical evidence during an investigation. Forensic DNA analysis specializes in biological evidence (e.g. blood, saliva) for DNA analysis and paternity testing for rape cases, among others. Forensic toxicology involves identifying drugs, alcohol, poison and other substances in both the human body and animals, particularly in cases involving poisoning. This course is a practical introduction on basics of forensic DNA analysis (profiling human and bacteriological DNA with PCR and DNA electrophoresis) and forensic toxicological (analytical) methods (fluorescence and UV-Vis Spectroscopy, GC and HPLC).					
Course learning outcomes: 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1e Working in accordance with the work plan when carrying out the assignment and finding effective ways of achieving the intended results. Applying basic knowledge or skills. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines. 1.1i Actively working as part of a team, processing the feedback on the work delivered to achieve better results. Being able to communicate concisely about goals and results as the work progresses. 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B3.9, B4.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S2	
CU24075	**Title: Spectroscopy 3 / Separations 1 & DNA 1**

Course information

Amount of study credits:	**Language:**
5	English

Conditions for course participation:
None.

Conditions for test participation:

Brief description of course content:

The course provides theoretical backgrounds of forensic science and analytical techniques related to chemical profession. In Separations 1 you learn the basis of High Performance Liquid Chromatography and Gas Chromatography coupled to different detectors. You learn how to approach an analysis and make choices which make you more efficient in your work. (method development). In Spectroscopy 3 you learn the theory behind the molecular spectrometric techniques such Fluorescence. In DNA 1 you are first introduced to the chemical properties of DNA as a macromolecule. You learn about sequencing techniques. Also you learn about STR's used in identification on DNA forensic samples. You learn the mechanism, possibilities and limitations of the techniques in the context of forensic science.

Course learning outcomes:
TOETS01 (Spe3/Sep1)
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

TOETS02 (DNA1)
2.1a Explaining the objective of the experiment.
2.1b Explaining the principle of the method and technique provided.
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.

Compulsory literature:

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Spectroscopy 3 / Separations1 - Exam	50%	5.5	B3.8, B3.10
TOETS02 (VT)	Written knowledge test	DNA 1 - Written exam	50%	5.5	B3.8, B3.10

Block / Semester: S2					
CU76021	**Title: Data analysis 3**				
Course information					
Amount of study credits: 1.25			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course is a follow-up course of data analysis 1 and 2and focus on the quality of analytical measurements. Major topics of this course are sampling, ANOVA, quality control, control charts (Shewhart charges) and proficiency testing scheme.					
Course learning outcomes: 1.2f Summarising and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 2.2f Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Data analysis 3 - Written exam	100%	5.5	B3.8, B3.10

Block 8 Marine Biobased Chemistry

Block / Semester: S2	
CU24077V1	**Title: Marine Biobased Chemistry**
Course information	
Amount of study credits: 5	**Language:** English
Conditions for course participation: None.	
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).	
Brief description of course content: This course focuses on the students practical research skills, which included dynamics of teamwork, finding and citing published information, and experimental design. The course is in close cooperation with the research group Marine Biobased Specialties and will include their research subjects. Includes separation techniques.	
Course learning outcomes: 1.1a Communicating with the client about the problem and the objective of the research 1.1b Gaining an insight into the professional aspects of the research by studying the literature or sources provided. 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1d Developing an approach to carrying out the research activities of a simple research assignment according to a format provided, including the planning of the work. 1.1e Working in accordance with the work plan when carrying out the assignment and finding effective ways of achieving the intended results. Applying basic knowledge or skills. 1.1f Summarizing the data from the research activities, structuring it in the light of the research question and presenting it clearly. Reflecting critically on the results to determine whether they are realistic. 1.1g Using the research results to formulate conclusions relating to the research question and if necessary submitting a proposal for improving the implementation of the assignment/the research. 1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines. 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1c Becoming proficient in the correct handling of the equipment. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1e Working according to HSE standards and taking ethical and sustainability standards into account when preparing and conducting the experiment. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.1g Giving reasons to establish whether the approach to the experiment has been followed correctly.	
Compulsory literature:	

Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Reporting	100%	5.5	B4.9, B4.12
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S2					
CU24078	**Title: Research cycle & Separations 2 / Biochemistry 2**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course focuses on the students practical research skills, which included dynamics of teamwork, finding and citing published information, and experimental design. The course is in close cooperation with the research group Marine Biobased Specialties and will include their research subjects.					
Course learning outcomes: TOETS01 (Research) 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. TOETS02 (Sep2/Bch2) 2.1a Explaining the objective of the experiment. 2.1b Explaining the principle of the method and technique provided. 2.1d Properly preparing an experiment on the basis of a protocol/approach provided, conducting it and obtaining replicable results within the specified time and maintaining accurate and clear documentation. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Criterion-referenced assessment	Research cycle - Oral exam	50%	5.5	B4.8, B4.10
TOETS02 (VT)	Written knowledge test	Separations 2 & Biochemistry 2 - Exam	50%	5.5	B4.8, B4.10

Block / Semester: S2					
CU76023V1	**Title: Labmanagement & Safety**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: The course is an introduction to general safety and safety topics related to chemicals and the production, processing, transport and storage of chemicals, including the legal aspects and a person's own responsibility.					
Course learning outcomes: 1.2f Acting as a full team member in his own work environment (through reflection and feedback). 1.2h Combining the full or partial results into one report in accordance with the applicable guidelines/ standard. 4.1a Identifying and noting actual or potential problems in implementing a management system 4.1b Reviewing the options for improving the implementation of a management system. 4.1c Showing that he is familiar with relevant legislation. 4.1e Reporting on compliance with the guidelines for the management systems used when carrying out his activities.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Labmanagement & Safety - Report	100%	5.5	B4.9, B4.12

Block / Semester: S2					
CU24080	**Title: Professionalization block 7 & 8**				
Course information					
Amount of study credits: 1.25			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Assignments, individual and as a group to work on personal professional skills and knowledge of the students competencies to develop toward a professional chemistry employee.					
Course learning outcomes: 5.1a Listening to the client and repeating the question in your own words. 5.1b Describing the provided information about the context. 5.1c To use the technical knowledge provided to propose a possible solution. 5.1d To motivate the chosen solution for the question. 8.1a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.1b Identifying any need to adjust his own performance in the academic environment. 8.1d Seeking information in order to improve his own performance. 8.1e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B4.9, B4.12

English

A student will follow at least one of the Foundation courses English: B1, B2, C1 or C2 level.

Semester: S1- S2					
EN39001	**Title: Foundation Course B1**				
Course information					
Number of study credits: 5			**Language:** Engels		
Conditions for course participation: -					
Conditions for test participation: -					
Brief description of course content: Students can take the placement test and/or consult the LCC teacher before they decide for which English foundation course they will register. Course Level: A2/low B1 aiming at strong B1. Learning Outcomes: ▪ ***Reading***. Ability to: understand emails/letters giving routine information or personal opinion; understand factual newspaper articles; understand the gist of theoretical academic articles on familiar topics. ▪ ***Writing***. Ability to: write emails/letters based on personal experience or familiar matters; make reasonably accurate notes from meetings and seminars on familiar topics; make basic notes in lectures. ▪ ***Listening***. Ability to: understand clear basic instructions; identify the main topic of a basic broadcast or lecture with some guidance; understand instructions on classes and assignments by lecturers. ▪ ***Speaking***. Ability to: express opinions on simple matters; ask for basic information; offer basic advice on familiar topics; take part in a seminar or meeting using simple language. Based on CEFR. For more details see: https://learn.hz.nl/pluginfile.php/289968/mod_resource/content/0/CEFR-all-scales-and-all-skills.pdf					
Learning outcomes: Strong B-1 level					
Compulsory literature: Open World Preliminary: Student's Book with Answers with Online Practice, Niamh Humphreys; Susan Kingsley, 1e version, ISBN: 9783125405967, Costs: €37,00, Open World Preliminary: Student's Book with Answers with Online Practice					
Assessment information					
Tests code	**Assessment type**	**Content**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities**
TEST01 (VT)	Written knowledge test	Reading	25%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9

TEST02 (VT)	Written knowledge test	Writing	25%	5,5	B3.8; B4.8; B3.10; B4.10
TEST03 (VT)	Written knowledge test	Listening	25%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST04 (VT)	Assignment (group)	Speaking	25%	5,5	B4.8; B3.9; B4.9; B3.10; B4.10

Semester: S1 - S2

EN39002	**Title: Foundation Course B2**

Course information

Number of study credits:	**Language:**
5	Engels

Conditions for course participation: -

Conditions for test participation: -

Brief description of course content:

Students can take the placement test and/or consult the LCC teacher before they decide for which English foundation course they will register. Course level: B1/low B2 aiming at strong B2.

Learning Outcomes:

- ***Reading/ Use of English.*** Ability to: scan texts for relevant information; understand the gist of information and articles on nonfamiliar topics and understand most of the content; apply and adapt language suitable for B2.
- ***Writing***. Ability to: express opinions and give reasons; write a simple piece of academic writing (e.g. a report) giving some evaluation, advice etc.; present arguments using a limited range of vocabulary and grammatical structures.
- ***Listening***. Ability to: follow a talk or lecture on a familiar topic; keep up with conversations on a wide range of topics; understand the answers to factual questions asked.
- ***Speaking***. Ability to: ask for clarification and further information; check for understanding; express opinions and arguments to a limited extent; answer predictable and factual questions.

Based on CEFR. For more details see: https://learn.hz.nl/pluginfile.php/289968/mod_resource/content/0/CEFR-all-scales-and-all-skills.pdf

Learning outcomes:

Strong B2 Level

Compulsory literature:

Open World B2, Anthony Cosgrove and Deborah Hobbs, 1e version, ISBN: 9783125406070, Costs: €40,80, Open World First: Student's Book with Answers with Online Practice

Assessment information

Tests code	**Assessment type**	**Content**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities**
TEST01 (VT)	Written knowledge test	Reading and Use of English	40%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST02 (VT)	Written knowledge test	Writing	20%	5,5	B3.8; B4.8; B3.10; B4.10
TEST03 (VT)	Written knowledge test	Listening	20%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9

TEST04 (VT)	Assignment (group)	Speaking	20%	5,5	B4.8; B3.9; B4.9; B3.10; B4.10

Semester: S1 - S2

EN39003	**Title: Foundation Course C1**

Course information

Number of study credits:	**Language:**
5	Engels

Conditions for course participation: -

Conditions for test participation: -

Brief description of course content:

Students can take the placement test and/or consult the LCC teacher before they decide for which English foundation course they will register. Course Level: B2/low C1 aiming at strong C1

Learning Outcomes:

- ***Reading/Use of English.*** Ability to: read quickly enough to cope with an academic course delivered in English; understand complex and arguments in lectures without serious misunderstandings; scan texts for relevant information and understand the gist of the text; apply and adapt language suitable for C1.
- ***Writing***. Ability to: make reasonable accurate notes in meetings and lectures; write a piece of work whose message can be followed throughout; write a piece of work showing the ability to communicate with no serious errors.
- ***Listening and speaking***. Ability to: contribute effectively in meetings and seminars in own field of study, probing for more information if required; maintain a casual conversation with a good degree of fluency; take part in an abstract conversation with a good degree of fluency; follow discussions and arguments with only occasional need for clarification; employ good compensation strategies to overcome linguistic inadequacies; deal with unpredictable questions; give critical feedback in a non-offensive manner.

Based on CEFR. For more details see: https://learn.hz.nl/pluginfile.php/289968/mod_resource/content/0/CEFR-all-scales-and-all-skills.pdf

Learning outcomes:

Strong C-1 level

Compulsory literature:

Open World First Student's Book with Answers with Online Practice, Anthony Cosgrove Deborah Hobbs, 1e version, ISBN: 9781108759052, Costs: €36,99, Open World First Student's Book with Answers with Online Practice

Assessment information

Tests code	**Assessment type**	**Content**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities**
TEST01 (VT)	Written knowledge test	Reading and Use of English	40%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST02 (VT)	Written knowledge test	Writing	20%	5,5	B3.8; B4.8; B3.10; B4.10

TEST03 (VT)	Written knowledge test	Listening	20%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST04 (VT)	Assignment (group)	Speaking	20%	5,5	B4.8; B3.9; B4.9; B3.10; B4.10

Semester: S1 - S2

EN39004	**Title: Foundation Course C2**

Course information

Number of study credits:	**Language:**
5	Engels

Conditions for course participation: -

Conditions for test participation: -

Brief description of course content:

Students can take the placement test and/or consult the LCC teacher before they decide for which English foundation course they will register. Course level: C1/low C2 aiming at strong C2.

Learning Outcomes:

- ***Reading/Use of English***. Ability to: understand complex documents and reports; understand academic articles in a relevant field including complex ideas expressed in complex language; access all sources of information quickly and reliably; apply and adapt language suitable for C2.
- ***Writing***. Ability to: make full notes of meetings and seminars with good expression and accuracy; make full notes of meetings and seminars while continuing to participate; make accurate and complete notes of a lecture.
- ***Listening and speaking***. Ability to: advise on or talk about sensitive or complex issues (within field of knowledge) with ease; deal confidently with hostile questions; speak fluently and express/understand nuances of language; present a clear, smooth-flowing description or argument in a style appropriate to the context with an effective logical structure.

Based on CEFR. For more details see: https://learn.hz.nl/pluginfile.php/289968/mod_resource/content/0/CEFR-all-scales-and-all-skills.pdf

Learning outcomes:

Strong C-2 level

Compulsory literature:

Objective Proficiency Student's Book with Answers with Downloadable Software Annette Capel and Wendy Sharp, Annette Capel and Wendy Sharp, ISBN: 9781107646377, Costs: €35,99, Objective Proficiency Student's Book with Answers with Downloadable Software Annette Capel and Wendy Sharp

Assessment information

Tests code	**Assessment type**	**Content**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities**
TEST01 (VT)	Written knowledge test	Reading and Use of English	40%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST02 (VT)	Written knowledge test	Writing	20%	5,5	B3.8; B4.8; B3.10; B4.10

TEST03 (VT)	Written knowledge test	Listening	20%	5,5	B3.6; B4.6; B3.7; B4.7; B3.8; B4.8; B3.9; B4.9
TEST04 (VT)	Assignment (group)	Speaking	20%	5,5	B4.8; B3.9; B4.9; B3.10; B4.10

Free Composition Course

Block / Semester: S1 **Block / Semester: S2**					
CH-HZP-YEAR2-22	**Title: HZ Personality year 2**				
Course information					
Amount of study credits: 2.5			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Within HZ Personality you will work on skills that you think are important for your personal and professional development. You design the programme yourself and reflect on the approach you have chosen, and the insights obtained. Your study career coach will guide you in this. HZ Personality has three connected levels: you, others, the world. During your study time at HZ you will have to work at least one time on each of these levels in order to broaden your view and experiences on every level. The levels are translated into three themes:Personal development, Community development and Sustainable development					
Course learning outcomes: Developing skills and attitudes to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals and community goals.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Self-reflection & burden of proof	100%	-	

Specialisation Applied Chemistry

Block / Semester: S1					
CU76000V1	**Title: Chromatography practice**				
Course information					
Amount of study credits: 5		**Language:** English			
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: This practical is an advanced application of the theory obtained in Blok 7 and 8 (Separations). You will design and perform your own experimental approach starting from published scientific literature. Method development is a relevant part of this class as well as your own preparation and understanding of the topics. You will get hands-on experience with techniques such: HPLC-UV, GC-FID, Headspace-GC-FID, GC-MS. Sample preparation is an important part of the class as well as the reporting of the data and co-operation within your practical-team.					
Course learning outcomes: TOETS01 (report practical work) 1.2c Formulating, under supervision, sub-questions and research activities regarding the research to be carried out. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 1.2g Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps. 1.2h Combining the results into one report in accordance with the applicable guidelines/ standard. TOETS02 (report on trouble shooting) 2.2c Becoming so skilled in operating the available equipment that adjusting the settings leads to desired effects. 1.2f Summarising and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Report on practical work	40%	5.5	B1.9, B2.3
TOETS02 (VT)	Assignment (group)	Report on troubleshooting	60%	5.5	B1.9, B2.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1					
CU76001V1	**Title: Polymer chemistry & analysis**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course provides an introduction to the chemical structure of the most common polymers, formation mechanisms and their physical properties. In addition, you will also discuss polymer processing techniques and analytical techniques. Special attention is dedicated to analysis by means of Size Exclusion Chromatography. Separations techniques and especially troubleshooting are highlighted. Part of the course is an on-site practical in a company.					
Course learning outcomes: 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 1.1d Developing an approach to carrying out the research activities of a simple research assignment according to a format provided, including the planning of the work. 1.2h Combining the results into one report in accordance with the applicable guidelines/ standard. 2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic. 2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective. 2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings. 8.1d Seeking information in order to improve his own performance.					
Compulsory literature: Chemistry of polymers,, Nicholson, John W., 4th edition, ISBN: 9781849733915					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Polymer chemistry & analysis - Exam	100%	5.5	B1.9, B2.10

Block / Semester: S1					
CU76002	**Title: Circular Chemistry**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: Complete the formative assignment and formative literature review assignment of this course.					
Brief description of course content: The solution to rising fossil fuels prices, depletion of raw materials and the reduction of greenhouse gases is the development of green chemicals and sustainable production processes. This course is an introduction to the biobased economy, biobased products and biobased chemical techniques. With regards to the importance of the transition of an economy based on oil to a circular and biobased economy awareness will be created. Together we will discuss the consequences of making choices and the ethical behavior of the student. All knowledge acquired in previous Chemistry courses will be useful during this course. The principles of Green Chemistry will be discussed. Guest speakers will provide the link with practice. Because the subject of Biobased Chemistry is in development, you will frequently use peer reviewed literature.					
Course learning outcomes: 8.1c Communicating with others about professional and ethical dilemmas and identifying professional and ethical dilemmas. 8.2c Taking note of any professional and ethical dilemmas and giving his opinion on them.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Final exam	100%	5.5	B2.8, B2.10

Block / Semester: S1					
CU76006V1	**Title: Circular Chemistry practice**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: In a practical assignment you will apply your acquired knowledge and deepen it further. You will investigate regional biomass (such as marine algae) as potential renewable resource. The research will be done in collaboration with the research group 'Marine Biobased Specialties'. In a student group you will independently develop a protocol to extract and quantify an interesting chemical component from marine biomass. You will be supervised by the teacher and get his/her help in making a plan of appraoch.This practical part is also a good preparation for the upcoming minor, internship and final graduation.					
Course learning outcomes: 1.2c Formulating, under supervision, sub-questions and research activities regarding the research to be carried out. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 1.2e Working in accordance with the work plan when carrying out the assignment. Implementing the work plan effectively and efficiently and determining whether interim adjustments are necessary on the basis of interim results. Applying relevant knowledge or skills. 1.2g Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps. 1.2i Acting as a full team member in the student's working environment, where feedback and reflection lead to better results, reasoned choices and effective coordination in conducting the research. Being able to match communication on progress to the situation. 2.2c Becoming so skilled in operating the available equipment that adjusting the settings leads to desired effects. 2.2d Preparing a schedule for implementing a protocol/ approach, conducting the experiment and obtaining reproducible results within the specified time and maintaining accurate and clear documentation. 2.2e Assessing whether the approach can be implemented according to HSE, ethical and sustainability standards. 6.1d Being aware of the importance of continuously developing his expertise.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Report practical work	100%	5.5	B2.9, B3.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU76007	**Title: Advanced Chromatography**

Course information

Amount of study credits:	**Language:**
5	English

Conditions for course participation:
None.

Conditions for test participation:
None.

Brief description of course content:
This course is a follow-up of the separation part of block 7,8 and 9. The focus is solving troubleshooting casus from practical situations, adding new knowledge of advanced level such new developments in chromatography and two-dimensional chromatography (GCxGC and LCxLC) in combination to lab visits and guest lectures to international companies such Dow Benelux, Sabic and Restek.

Course learning outcomes:
TOETS01
2.1f Processing measurement results properly and correctly and estimating whether a result obtained is realistic.
2.2f Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided.
1.1c Explaining the relationship between the research question provided, sub-questions and research activities.
2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings.

TOETS02
2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings.
1.1h Reporting orally and/or in writing on the assignment in accordance with specified guidelines.

Compulsory literature:

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Advanced Chromatography - Written exam	70%	5.5	B2.8, B2.10
TOETS02 (VT)	Presentation (group)	Advanced Chromatography - Presentation	30%	5.5	B2.9, B3.3

Block / Semester: S1					
CU76008	**Title: Circular chemistry & Biopolymers**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: You will study in a specific topic of biobased chemistry (e.g. biodiesel, packing material, biopolymers, biobased colors, etc.). You will compare fossil fuel products with products that are produced in a biobased way and you are able to name the pros and cons. You will study companies that produce biobased products. By means of literature research, you increase your knowledge about the topic you have chosen. For completion you will write a literature review on your biobased chemistry topic with the aim that your fellow students can use this review as reference work. In addition, you share the knowledge gained with your fellow students by giving a presentation. After this presentation, your findings will be discussed with both teacher and fellow students.					
Course learning outcomes: 1.1c Explaining the relationship between the research question provided, sub-questions and research activities. 2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings. 2.2f Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Presentation (group)	Literature review & Presentation	100%	5.5	B2.9, B3.3

Block / Semester: S1					
CU13633V5	**Title: Professionalization block 9 &10**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course comprises the following activities: - Study progress - Orientation on profession - Personal development - Just in time workshops - Finding a suitable internship - Guest lectures					
Course learning outcomes: 8.2a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.2b Identifying any need to adjust his own performance in the academic environment. 8.2d Seeking information in order to improve his own performance. 8.2e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B2.9, B2.10

Specialisation Life Sciences

Block / Semester: S1	
CU76003V1	**Title: Immunology practice**
Course information	
Amount of study credits: 5	**Language:** English
Conditions for course participation: None.	
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).	
Brief description of course content: Experiments on microbiology • Bacteriophage titer determination: You will determine a phage titer of a culture of E.coli infected with a selected bacteriophage. • Induction and repression of beta-galactosidase: We want to know how the b-galactosidase-activity per number of cells develops over time under the different conditions. Next to practicing your planning skills, you will measure enzyme activity. Experiments on immunochemistry: • ELISA: You will test if a subject is infected by a virus or not by performing an ELISA-assay. In the ELISA well a fixed anti-body will bind to an antigen/antibody if present in a sample. A secondary anti-body is linked to an enzyme that will convert substrate in to a signal emitting product. • SPE: You will analyze different blood sample on their albumin and globuline content by Serum Protein Electrophoresis. From the gel results you will be able to link a health issue of the test subject to the SPE profile of the globulines.	
Course learning outcomes: 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 1.2e Working in accordance with the work plan when carrying out the assignment. Implementing the work plan effectively and efficiently and determining whether interim adjustments are necessary on the basis of interim results. Applying relevant knowledge or skills. 1.2f Summarizing and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 1.2g Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps. 1.2h Combining the results into one report in accordance with the applicable guidelines/ standard. 2.2d Preparing a schedule for implementing a protocol/ approach, conducting the experiment and obtaining reproducible results within the specified time and maintaining accurate and clear documentation. 2.2g Giving reasons to establish whether the approach to the experiment requires improvement. 7.1b Helping to allocate tasks and work. 7.1c Being approachable and accessible for employees, fellow students and lecturers. 8.1b Identifying any need to adjust his own performance in the academic environment. 8.1e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.	
Compulsory literature:	

Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Report practical work	100%	5.5	B1.9, B2.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU76004	**Title: Immunology 1 & Biochemistry 3**

Course information

Amount of study credits:	**Language:**
5	English

Conditions for course participation:

None.

Conditions for test participation:

None.

Brief description of course content:

Immunology 1. In this course you will study bacteria and viruses, and the mechanisms by which they cause disease. In addition, you will become acquainted with the complex reaction of our immune system to invading microorganisms.
Biochemistry 3. All life forms are similar at the molecular level. The processes by which they acquire and use energy, grow, replicate, and adapt follow similar basic rules. Biochemistry studies these processes, from metabolism of unicellular bacteria to cellular communication in mammals. In this course we will deal with the basic chemistry of life, the structure and function of proteins and how to study them. Furthermore this course addresses the energy metabolism of sugars, fats and amino acids, and how all these factors are related to the lifestyle and living environment of the organism.

Course learning outcomes:

TOETS01 (Imm1)
1.2a Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment.
1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions.
2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective.
2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings.

TOETS02 (Bch3)
1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected.
2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective.

Compulsory literature:

Biochemistry and Molecular Biology, Elliot, D. Elliot, W. Papachristodoulou, L., 6th edition, ISBN: 9780198768111

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Immunology 1 - Written exam	50%	5.5	B1.9, B2.10
TOETS02 (VT)	Written knowledge test	Biochemistry 3 - Written exam	50%	5.5	B1.9, B2.10

Block / Semester: S1					
CU13416V6	**Title: Biotechnology**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Subjects from the previous life science courses will be reinterpreted in the context of the diverse and multidisciplinary biotechnological workforce that the students will become part of. Biotechnology draws knowledge and expertise from many basic sciences and combines that knowledge in a wide array of applications.					
Course learning outcomes: 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 8.2c Taking note of any professional and ethical dilemmas and giving his opinion on them.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Active participation, including preparation and reflection	100%	5.5	B1.9, B2.3

Block / Semester: S1					
CU76009V1	**Title: Molecular Biology toolbox**				
Course information					
Amount of study credits: 5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: Completion of the scheduled practical exercise is conditional for participation (article 6.3 paragraph 4 CER HZ).					
Brief description of course content: In this course you will develop more advanced skills in molecular biology research; starting with protocol development, up to executing experiments of your own mini project. The techniques that you will learn are e.g. recombinant DNA technology, genetic screening, purification and (activity) analysis of proteins, mammalian cell culturing, and transfection.					
Course learning outcomes: 1.2a Analyzing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment. 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 1.2c Formulating, under supervision, sub-questions and research activities regarding the research to be carried out. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 1.2e Working in accordance with the work plan when carrying out the assignment. Implementing the work plan effectively and efficiently and determining whether interim adjustments are necessary on the basis of interim results. Applying relevant knowledge or skills. 1.2g Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps. 1.2h Combining the results into one report in accordance with the applicable guidelines/ standard. 2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings. 2.2d Preparing a schedule for implementing a protocol/approach, conducting the experiment and obtaining reproducible results within the specified time and maintaining accurate and clear documentation. 2.2g Giving reasons to establish whether the approach to the experiment requires improvement.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Research report	100%	5.5	B2.9, B3.3
Practical excercise					
PRAKT-OEF (VT)	Practical excercise	The practical exercise is a combination of related skills training during the block.			

Block / Semester: S1	
CU76010	**Title: Immunology 2 & DNA 2**
Course information	
Amount of study credits: 5	**Language:** English
Conditions for course participation: None.	
Conditions for test participation: None.	
Brief description of course content: **Immunology 2**. In this course you will study bacteria and viruses, and the mechanisms by which they cause disease. In addition, you will become acquainted with the complex reaction of our immune system to invading microorganisms. **DNA2**. The completion of the Human Genome Project (HUGO), in which the entire human DNA sequence was determined, marked the beginning of a new era of scientific and technological development on the field of genetics. The speed of genetic sequencing techniques has increased, and the accompanying costs have plummeted. Sequencing the first human genome took 10 years and costed nearly $3,000,000,000. Nowadays, over a decade after its completion, the same procedure takes roughly a week at a cost of $10,000. The knowledge we have gained about human genetic diversity enables us to determine not only gender but also geographic origin, hair and eye colour of unidentified persons (CSI). Screening unborn children for genetic diseases (e.g. Down Syndrome) can now be performed by extracting foetal DNA from the blood of the mother instead of taking a sample of amniotic fluid, which entails the risk of inducing abortion. We can use a genetic profile to determine whether someone is at risk of developing certain forms of cancer (e.g. breast cancer). Besides human genetics, genomic screens are now common practice in breeding new variants of plants that are resistant against drought or pests. Genetic engineering has produced cotton plants that produce their own insecticides, and it enables us to produce human insulin in bioreactors to provide therapeutics for the treatment of diabetic patients. Genetics is everywhere in our society, and in this course we will study its principles, techniques, and application from basic single gene cloning to genome wide screening, and whole genome sequencing.	
Course learning outcomes: TOETS01 (Imm2 - written test) 1.2a Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective. 2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings. TOETS02 (Imm2 - presentation) 1.1b Gaining an insight into the professional aspects of the research by studying the literature or sources provided. 6.1.c explaining things clearly 6.1d Being aware of the importance of continuously developing his expertise. 8.2b Using feedback on his own performance to adapt to the working environment. TOETS03 (DNA2) 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective. 2.2b Assessing the suitability of methods and protocols and resolving experimental problems (troubleshooting).	
Compulsory literature: From Genes to Genomes: Concepts and Applications of DNA Technology (softcover), Plant, N.D., Schantz, M. Von, Dale, J.W., 3rd edition, ISBN: 9780470683859	
Assessment information	

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Written knowledge test	Immunology 2 - Written exam	40%	5.5	B2.8, B2.10
TOETS02 (VT)	Presentation (group)	Immunology 2 – Presentation	10%	5.5	B2.9, B3.3
TOETS03 (VT)	Written knowledge test	DNA2 - Written exam	50%	5.5	B2.8, B2.10

Block / Semester: S1					
CU13415V6	**Title: Bioinformatics**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Data is everywhere. Due to the enormous decrease in sequencing costs and the technical ease by which sequences can be determined, biomolecular research is becoming swamped by a deluge of data. You will need to make sense of it all, and this is where information technology comes into play. Besides storing and managing data – an achievement in itself – it is also necessary to share and compare the sequences to reveal 'invisible' patterns of similarities and differences, the biological relevance of sequence variants, and the evolution mechanisms underlying the enormous sequence variation that unites and distinguishes all life forms. Although bioinformatics itself is a scientific discipline that combines mathematics, information sciences, and biology, in this course we will primarily focus on the practical part, asking the following questions: 'What can I actually learn from this sequence?' and 'How on earth should I begin?'					
Course learning outcomes: 1.2h Combining the full or partial results into one report in accordance with the applicable guidelines/standard. 1.2g Summarising and interpreting the full or partial results in relation to the assignment/research question.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Presentation (individual)	Oral presentation and written assignments	100%	5.5	B2.9, B3.3

Block / Semester: S1					
CU13633V5	**Title: Professionalization block 9 &10**				
Course information					
Amount of study credits: 2.5			**Language:** English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: This course comprises the following activities: - Study progress - Orientation on profession - Personal development - Just in time workshops - Finding a suitable internship - Guest lectures					
Course learning outcomes: 8.2a Working towards an established learning objective. Discussing the learning strategy and the ensuing results; being aware of the function of a learning objective and how to use it in his learning strategy. 8.2b Identifying any need to adjust his own performance in the academic environment. 8.2d Seeking information in order to improve his own performance. 8.2e Critically evaluating his own actions and thinking. Being aware of the effect of his own attitude to work on others and on group members in the case of a project.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Individual reflection	100%	5.5	B2.9, B2.10

Minor

Block / Semester: S1 **Block / Semester: S2**	
CU05600V12	**Title: Research minor**
Course information	
Amount of study credits: 30	**Language:** English Dutch
Conditions for course participation: See article 3.8 paragraph 4 CER HZ.	
Conditions for test participation: None.	
Brief description of course content: In the Chemistry research minor, you will learn in the familiar environment of the HZ how to conduct assignment-led research. The assignment may have been provided by an internal research group such as OG Aquaculture or an external party such as Philips or Applied Instruments. You are responsible for the complete assignment. This includes defining research questions, performing in-depth research, presenting and discussing results, and writing a report.	
Course learning outcomes: TOETS01 1.2a Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment. 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 1.2c Formulating, under supervision, sub-questions and research activities regarding the research to be carried out. 1.2d Preparing a work plan in consultation, drawing up the plan independently, taking account of any preconditions. 1.2e Working in accordance with the work plan when carrying out the assignment. Implementing the work plan effectively and efficiently and determining whether interim adjustments are necessary on the basis of interim results. Applying relevant knowledge or skills. 1.2f Summarizing and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 1.2g Using the research results to formulate conclusions relating to the research question and using these to make a proposal for follow-up steps. 1.2h Combining the results into one report in accordance with the applicable guidelines/ standard. 1.2i Acting as a full team member in the student's working environment, where feedback and reflection lead to better results, reasoned choices and effective coordination in conducting the research. Being able to match communication on progress to the situation. 2.2a Choosing an approach and explaining why it is a suitable way of achieving the objective. 2.2b Having sufficient knowledge and understanding of available methods and techniques to assess their suitability and choose the right equipment and/or device settings. 2.2c Becoming so skilled in operating the available equipment that adjusting the settings leads to desired effects. 2.2d Preparing a schedule for implementing a protocol/ approach, conducting the experiment and obtaining reproducible results within the specified time and maintaining accurate and clear documentation. 2.2f Assessing the reliability of a result on the basis of an (e.g. statistical) analysis provided. 2.2g Giving reasons to establish whether the approach to the experiment requires improvement. TOETS02 5.1a Listening to the client and repeating the question in your own words. 5.1c To use the technical knowledge provided to propose a possible solution. 8.2a Determining his own learning objective and learning strategy in consultation/without assistance and reflecting on the result. 8.2b Using feedback on his own performance to adapt to the working environment. 8.2e Drawing conclusions on his actions and if necessary articulating them to others.	
Compulsory literature:	
Assessment information	

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (group)	Report, presentation and defence	60%	5.5	Not applicable
TOETS02 (VT)	Portfolio	Portfolio	40%	5.5	Not applicable

Internship

Block / Semester: S1 **Block / Semester: S2**	
CU06725V18	**Title: Internship in company**
Course information	
Amount of study credits: 27.5	**Language:** Dutch English
Conditions for course participation: See article 2.2.8 IR CER HZ.	
Conditions for test participation: The in-company functioning (appendix 4 of manual 'Internship') must be graded with at least 5.5. At insufficient level, the internship must be done all over again (at same or different location).	
Brief description of course content: Carry out one or more assignments that help you acquire the competences (learning objectives) recorded in the internship plan.	
Course learning outcomes: TOETS01 1.2b Gaining an insight into the problem and the professional aspects of the research by studying the literature or sources the student has selected. 1.3a Analysing, independently, a problem provided and translating it into the objective of the research assignment. 1.3c Formulating, without assistance, sub-questions and research activities regarding the research to be carried out. 1.3h Reporting on the research in accordance with the standard applicable in the professional field. TOETS02 1.2a Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment. 1.2f Summarising and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 1.3e Implementing a complex work plan effectively and efficiently and updating it as necessary in between times. Acquiring relevant knowledge and putting it into practice. 1.3f Logically and clearly combining the full or partial results and interpreting them in relation to the research question. Performing an analysis of the reliability of the results. 7.1c Being approachable and accessible for employees, fellow students and lecturers. 8.2a Determining his own learning objective and learning strategy in consultation/without assistance and reflecting on the result. 8.2b Using feedback on his own performance to adapt to the working environment. 8.2d Taking on board criticism of work delivered and discussing his own performance with colleagues. 8.2e Drawing conclusions on his actions and if necessary articulating them to others. TOETS03 1.2a Analysing a problem in consultation and in a coordinated way and translating it into the objectives of the research assignment. 1.2f Summarising and interpreting the full or partial results in relation to the assignment/research question. Critically reflecting on the reliability of the results. 1.3e Implementing a complex work plan effectively and efficiently and updating it as necessary in between times. Acquiring relevant knowledge and putting it into practice. 1.3f Logically and clearly combining the full or partial results and interpreting them in relation to the research question. Performing an analysis of the reliability of the results. 7.1c Being approachable and accessible for employees, fellow students and lecturers. 8.1d Seeking information in order to improve his own performance.	
Compulsory literature:	

Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (individual)	Internship report	60%	5.5	Not applicable

TOETS02 (VT)	Portfolio	Final Evaluation (portfolio with evidence)	20%	5.5	Not applicable
TOETS03 (VT)	(Workplace) Assessment	Company evaluation	20%	5.5	Not applicable

Final Thesis

Block / Semester: S1 **Block / Semester: S2**	
CU06726V16	**Title: Final Thesis & project**
Course information	
Amount of study credits: 30	**Language:** English Dutch
Conditions for course participation: See article 2.2.11 IR CER HZ.	
Conditions for test participation: The in-company functioning (appendix 4 of manual 'Final thesis') must be graded with at least 5,5. At insufficient level, the graduation internship must be done all over again (at same or different location).	
Brief description of course content: Conduct research: complex, practical assignment in complex situation, independent research, select from relevant methods.	
Course learning outcomes: TOETS01 1.3a Analysing, independently, a problem provided and translating it into the objective of the research assignment. 1.3b Selecting and obtaining, without assistance, scientific and other literature or sources in order to study the problem in greater depth, thereby validating the reliability of the different sources of information. 1.3c Formulating, without assistance, sub-questions and research activities regarding the research to be carried out. 1.3g Using the research results to formulate and interpret conclusions relating to the research question. Making proposals for follow-up research based on the conclusions. 1.3h Reporting on the research in accordance with the standard applicable in the professional field. 1.3i Acting as a full member and working as part of a team which also contains staff from other professional field(s). Communicating independently about the relevant substantive aspects of the progress. 2.3a Formulating, without assistance, an approach to achieving the objective of the experiment. 2.3b Choosing or developing suitable methods and techniques and anticipating possible experimental problems. 2.3f Choosing a statistical or other analysis for assessing the reliability and validity of the result obtained. 2.3g Making proposals, where necessary, to improve the approach and propose additional experiments. TOETS02 1.3d Preparing a work plan without assistance, taking into account the interdependencies of various research activities and preconditions. 1.3e Implementing a complex work plan effectively and efficiently and updating it as necessary in between times. Acquiring relevant knowledge and putting it into practice. 1.3f Logically and clearly combining the full or partial results and interpreting them in relation to the research question. Performing an analysis of the reliability of the results. 2.3c Being capable of learning independently about the possibilities and limitations of the equipment to be used in order to recognize experimental problems and be able to act accordingly. 4.1a Demonstrate general knowledge of the context in which relevant management systems are set up. 5.1a Listening to the client and repeating the question in your own words. 7.1d Being honest and reliable towards employees, fellow students and lecturers. 8.2a Determining his own learning objective and learning strategy in consultation/without assistance and reflecting on the result. 8.2b Using feedback on his own performance to adapt to the working environment. 8.2d Taking on board criticism of work delivered and discussing his own performance with colleagues. 8.2e Drawing conclusions on his actions and if necessary articulating them to others. TOETS03 1.3d Preparing a work plan without assistance, taking into account the interdependencies of various research activities and preconditions. 1.3e Implementing a complex work plan effectively and efficiently and updating it as necessary in between times. Acquiring relevant knowledge and putting it into practice. 1.3f Logically and clearly combining the full or partial results and interpreting them in relation to the research question. Performing an analysis of the reliability of the results. 2.3c Being capable of learning independently about the possibilities and limitations of the equipment to be used in	

order to recognize experimental problems and be able to act accordingly.
2.3d Preparing a schedule for a number of experiments, conducting them and obtaining reproducible results within the specified time and maintaining accurate and clear documentation.
4.1a Demonstrate general knowledge of the context in which relevant management systems are set up.

Compulsory literature:

Assessment information

Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Assignment (individual)	Final assessment of research competency	60%	5.5	Not applicable
TOETS02 (VT)	Portfolio	Final assessment of performance and prof	20%	5.5	Not applicable
TOETS03 (VT)	(Workplace) Assessment	Company evaluation	20%	5.5	Not applicable

Free Composition Course

Block / Semester: S1 **Block / Semester: S2**					
CH-HZP-YEAR3-22	**Title: HZ Personality year 3**				
Course information					
Amount of study credits: 2.5			**Language:** Dutch English		
Conditions for course participation: None.					
Conditions for test participation: None.					
Brief description of course content: Within HZ Personality you will work on skills that you think are important for your personal and professional development. You design the programme yourself and reflect on the approach you have chosen, and the insights obtained. Your study career coach will guide you in this. HZ Personality has three connected levels: you, others, the world. During your study time at HZ you will have to work at least one time on each of these levels in order to broaden your view and experiences on every level. The levels are translated into three themes:Personal development, Community development and Sustainable development					
Course learning outcomes: Developing skills and attitudes to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals and community goals.					
Compulsory literature:					
Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Self-reflection & burden of proof	100%	-	Not applicable

Block / Semester: S1 **Block / Semester: S2**	
CH-HZP-YEAR4-22	**Title: HZ Personality year 4**

Course information	
Amount of study credits: 2.5	**Language:** Dutch English
Conditions for course participation: None.	
Conditions for test participation: None.	
Brief description of course content: Within HZ Personality you will work on skills that you think are important for your personal and professional development. You design the programme yourself and reflect on the approach you have chosen, and the insights obtained. Your study career coach will guide you in this. HZ Personality has three connected levels: you, others, the world. During your study time at HZ you will have to work at least one time on each of these levels in order to broaden your view and experiences on every level. The levels are translated into three themes:Personal development, Community development and Sustainable development	
Course learning outcomes: Developing skills and attitudes to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals and community goals.	
Compulsory literature:	

Assessment information					
Test code	**Assessment type**	**Assessment description**	**Weighting Factor** (%)	**Minimum score**	**Test opportunities** (block codes)
TOETS01 (VT)	Portfolio	Self-reflection & burden of proof	100%	-	Not applicable