

B Information Technology  
34479

TER 23-24 Bachelor  
TOI

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# 1 PART 1. INTRODUCTION

## 1. Contents of the TER

These Teaching and Examination Regulations provide students with information about teaching and testing of the B Information Technology (CROHO-number: 34479). In this document, we refer to the Teaching and Examination Regulations as 'the TER'.

The TER also contains the rules that apply to teaching and testing.

The TER concerns teaching in the programme in all forms and variants, for both the September and February intakes.

As well as regular students (further referred to simply as 'students'), higher education programmes can include external students. Enrolment as an external student only entitles the student to take tests, not to attend classes. The TER only applies to students. The provisions relating to testing and examinations also apply to external students.

## 2. Organisation of this document

We expect students to be familiar with the contents of the TER. That does not mean that everyone has to learn the text by heart, but students who have general questions or problems should first check to see whether the TER can clarify the matter. Students can do a quick check for information by using the table of contents or the index. Note: the index does not indicate every single place where a word or concept is mentioned, but it does point to the place where the definition or key information can be found.

The TER applies to all students, regardless of when they first enrolled. This means that what was written in last year's TER does not automatically apply this year. Changes may have been made. Students who have to repeat or make up a component from a previous year therefore cannot assume that everything will still be the same. It is important to check the content, procedures and rules for this year in good time.

As much as possible, we explain the concepts that we use in this TER within the part of the text that deals with that concept. But we sometimes need to use a concept that we haven't already explained. In that case, you can use the index to find the definition of the concept.

The TER consists of ten parts. Most of these are further divided into chapters. All topics covered by the chapters have a heading in bold. These headings appear in the table of contents. These components (articles) are numbered sequentially, from Article [1](#) to Article [185](#).

## 2 PART 2. THE EXAMINATION BOARD AND THE TER

### 3. The Examination Board

The programme has an Examination Board. More information on the Examination Board can be found on Iris.

Chapter 2 of the Education Guide contains a comprehensive explanation of the duties and powers of the Examination Board.

The university believes it is important to have professionally run Examination Boards which:

- / are conscious of their independent and expert task of keeping a 'watchful eye' over the programmes, to ensure they are at an appropriate level of higher professional education;
- / perform their work in accordance with the applicable laws and regulations; and
- / occupy a strong position as an independent advisory body for the faculty director and programme management.

The TER describes the duties and powers of the Examination Board just as they are described in the Dutch Higher Education and Research Act (Wet op het hoger onderwijs en wetenschappelijk onderzoek, or WHW).

In individual cases, the Examination Board may decide to deviate from a rule in this TER.

Students must always submit a request for a deviation. Via this [link](#) students can read how and to whom they can submit requests. If there are special or personal circumstances, students should mention these as soon as possible to the student counselor.

The Examination Board handles requests only if they are submitted within the specified timeframe. If no timeframe is specified, students may submit requests at any time. Requests should be submitted as soon as possible. The Examination Board needs time to properly consider requests.

The Examination Board will specify the requirements that requests must meet and the supporting documents that must be included with requests.

For some matters, the TER specifies a timeframe within which an Examination Board will make its decision. The timeframe is expressed in working days. 'Working day' means any day from Monday up to and including Friday. The following days are not working days:

- public holidays set by the government;
- days on which the university is closed, as specified in the annual calendar.

For other requests and complaints, the decision-making timeframe is specified in the digital form which students must use to submit their request or complaint.

If a request is incomplete or was not submitted in the correct manner, the timeframe will start to run only when:

- the request has been correctly submitted;
- and the student has supplied all necessary information.

### 4. Disagreeing with a decision made under the TER

In Chapter 2 of this Education Guide and on Iris, under Knowing & Arranging, [Objection and Appeal](#), students can find a list of decisions by the Examination Board, an examiner or the faculty director, against which a student can lodge an appeal or objection. It is also explained what 'objection' and 'appeal' mean and what the procedure is.

For all decisions that are subject to objection or appeal, the process and timeframes for submitting an objection or appeal are specified.



## 3 PART 3. TEACHING

### Chapter 1. Objectives and professions for which students are trained

#### 5. Objectives, professional requirements and degree

The programme trains students to develop initial ability into professionalism. The programme has been set up in such a manner that the students can achieve the objectives with regard to knowledge, attitude, understanding and skills. Hereinafter, we refer to these four attributes as 'final qualifications'.

On receipt of the degree certificate, the degree for the Bachelor of Science programme will be awarded to the student.

The Information Technology / IT Professional who graduated from Inholland is an independent thinking professional who can make a meaningful contribution to the inclusive and sustainable globalized world of tomorrow with practical knowledge. This makes him one of the top programmers of the future. He can adapt to the rapidly changing digital world of the future and devises and develops sustainable and innovative solutions to create a sustainable and inclusive world.

Inholland's Information Technology professional graduates can be employed in the full spectrum of the ICT services sector. He develops software and user interfaces for the implementation of new ICT systems, the redesign of existing ICT systems and the management of ICT systems. To this end, the graduated Informatics / IT professional has a wide range of (specialised) up-to-date knowledge and skills, with a focus on writing and developing programs:

- Software development (computer and mobile)
- Cloud computing (design, implement and manage cloud-related systems, service integration and management)
- AI and machine learning (also: dealing and 'cooperating' with supporting AI and (partly) autonomously operating AI) Data analytics and data science
- Cyber security

Inholland's Computer Science / IT professional graduate applies these technologies in an integrated manner to provide pleasant user experiences, functionalities and services to employees, partners and customers. He realizes that it is no longer about the software and networks, but about the users and the experiences they have using it. Those users and their experiences are therefore his focus. He can empathize with the users and understands their wishes and needs.

He is able to ask for those wishes and needs and to use (big) data to gain insights regarding the users. He also has insight into and can deal with (social) unrest and resistance to technology.

### Chapter 2. Form and structure of the programme

#### 6. Study load

The study load of a programme is expressed in credits. Each credit represents an average of 28 hours of study. These credits are equivalent to the European Credits (ECTS) used in European higher education institutions.

The study load is:

Bachelor's programme: 240 credits (foundation phase 60 credits, main phase 180 credits).

#### 7. Foundation phase and main phase

The Bachelor's programme is divided into a foundation phase and a main phase.

In the foundation phase, students discover the content of the programme, the profession and what final qualifications are necessary for the programme. The purpose of the foundation phase is orientation, referral and selection. The foundation phase

ends with the foundation examination. Students pass the foundation examination if they have completed all units of study of the foundation phase successfully. See also Article [9. Units of study](#).

The main phase follows after the foundation phase. The main phase ends with the final examination. Students pass the final examination if they have successfully completed all units of study in the main phase.

#### 8. Joint foundation year

The programme does not have a joint foundation examination.

#### 9. Units of study

The programme is divided into units of study. Each unit of study consists of educational activities that:

- aim to help students acquire knowledge, skills, understanding, attitudes and reflection;
- relate to each other and form one entity.

The study load of a unit of study is expressed in whole credits.

A unit of study may be further divided into modules.

A module is a part of a unit of study for which a test applies.

Students complete each unit of study with one or more tests. See also Articles [93. Oral tests](#) and [94. Other types of tests](#).

## Chapter 3. Basic curriculum, specialisation, main subject,

#### 10. Basic curriculum

Every programme has a basic curriculum. This consists of the units of study that are mandatory for all students. In addition to the basic curriculum, students are presented with a range of additional optional subjects.

A Bachelor's programme can have specialisations or main subjects, or both. Programmes can also have different forms and variants.

#### 11. Specialisation

The programme has no specialisation.

#### 12. Main subject

A main subject has a narrower focus than a specialisation. Students take a set of units of study, which:

- are linked to one another;
- relate to a specific profession or discipline or a focus area within a profession or discipline.

Main subjects appear on degree certificates.

The programme has the following main subject: Mobile Development

#### 13. Optional subjects

The programme Information Technology offers the following optional subjects:

- Cloud computing
- Mobile Development
- Security
- User Experience
- Big Data & AI
- Free minor Software Development

These optional subjects (minors) are offered in both years 3 and 4. It can be taken within the student's own study program, at one

of the professorships within the research group, via "Kies op Maat" at another University of Applied sciences or at another university abroad. A student may take a maximum of 30 ECs of optional subjects (minors) outside the study program. If a student wishes to follow 15 or 30 ECs of optional subjects (minors) outside the study program, he / she must submit a plan to the Examination Board for approval in consultation with his / her study counselor. In this plan, the student must describe how he / she will obtain the competences of the bachelor's degree in Information Technology at the Start Qualified level.

A minor at another University or University of Applied Sciences must meet the following criteria:

- The chosen minor is a coherent package of 15 EC or 30 EC [You choose the entire package and cannot choose individual components]
- The student must choose at least 30 EC from the minors offered by our study programme. The student can therefore complete a maximum of 30 EC outside the study programme.
- Only fully completed external minors can be entered into the grading system.
- The external minor are at least Bachelor level 3.
- The external minor must have added value in relation to the chosen (or to be followed) minor(s) of the own study programme.
- In the case of an external minor, the student must be able to justify in a letter of motivation how the minor contributes to his/her own professional development as an intended ICT professional.
- The student can submit a maximum of 1 application for an external minor to the Board of Examiners at a time.

#### 14. Form: full-time, part-time, dual

Programmes are offered in full-time form, in part-time form and/or in dual form.

- With a **full-time programme**, the teaching is arranged so that students spend 1,680 hours per year on their studies, spread over 42 weeks.
- A **part-time programme** is set up so that the studies can fit in with a job, in the evenings or for a few hours in the daytime. Sometimes requirements apply to the job. Students cannot follow a part-time programme if they do not meet these requirements.
- With a **dual programme**, students work during their studies, or during parts of their studies. Their work is part of the programme, the 'professional component'. Students get credits for this part, provided they get a good evaluation.

The structure of the curriculum and the content of the units of study may differ between the various forms. But the final qualifications (learning outcomes) that students ultimately achieve and the total study load are the same for all forms.

Information Technology is only offered in full-time.

#### 15. Programme variants

Programmes can have different variants. The variants for the B Information Technology programme are:

The programme does not have variants.

The structure of the curriculum and the content of the units of study may differ between the variants, but the final qualifications (learning outcomes) that students ultimately achieve are the same for all variants.

#### 16. Honours programme

The program offers an honors program for students who want to develop into excellent professionals. Excellent professionals, in collaboration with others, come up with innovative solutions that are of practical significance for tackling socially important issues.

For the honours program, the study program selects the participants on the basis of selection criteria that are known in advance.

If the student completes the study program including an honors program, the certificate will state 'Honours Program'. The content of the program is stated in the diploma supplement. A diploma supplement is an English-language document containing the most important information about the study program that the student has completed and the results he has achieved.

<explanation>

### 17. Additional programmes

The programme does not offer an additional programme.

### 18. Transition from Bachelor's to Master's programmes

Does the Bachelor's programme have a transition programme for moving on to its own Master's programme, or to a Master's associated with another programme or at another institution?

The Bachelor's programme does not have a transition programme for moving on to its own Master's programme, or to a Master's associated with another programme or at another institution.

### 19. Transition from Ad to Bachelor's programmes (not applicable to Bachelor's programme)

This Article is not applicable to the Bachelor's programme. The Ad programme has a separate TER.

## Chapter 4. Programme structure, content and evaluation

### 20. Terms and calendar

The academic year comprises four terms, each approximately ten weeks long. There may also be a fifth term, which then runs from mid-July to the end of August.

See attached Schedule

### 21. Curriculum obsolescence and updating

The programme curriculum is updated regularly. The changes may be minor or major. Minor changes do not result in units of study or modules being renamed.

There will be minor changes to the curriculum for this program in the coming year. The following tests will no longer be included in the 2022-2023 curriculum.

Year	Unit of study	Unit of study code	Test	Test code	Last year in programme	Last year resit
1	Routing	1917IN142Z	Routing (CCNA2)	1912IC141A	2022-2023	23/24
1	Routing	1917IN142Z	Routing Practical	1916IC141B	2022-2023	23/24

### 22. Expiry dates of units of study and modules

Major changes result in the setting of an expiry date. The expiry date is the last date on which the unit of study or module, with the associated test(s), will form part of the programme curriculum.

If a module has an expiry date, the entire unit of study will expire on that date. Modules that are part of that unit of study but are not scheduled to expire will be incorporated into other units of study. The same applies to any test results or exemptions associated with the module. That other unit of study may be an existing unit of study or a new unit of study.

If a module is incorporated into another unit of study, a new weighting of its test will be set for the purpose of determining the final grade for that unit of study. See also Article [127. Grade for a unit of study](#).

The following tests have an expiration date of August 31, 202.

Year	Unit of study	Unit of study code	Test	Test code	Last year in programme	Last year resit
1	Routing	1917IN142Z	Routing (CCNA2)	1912IC141A	2022-2023	23/24

1	Routing	1917IN142Z	Routing Practical	1916IC141B	2022-2023	23/24
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### 23. Expiry date, transition period and validity period

The expiry date will be the last day of an academic year. We will announce the expiry date by no later than the first day of the next academic year. Depending on the timing of the announcement, a transition period may be added to the expiry date, by adding '+1 yr' or '+2 yrs'.

If students have already attended some of the classes for the unit of study that is going to expire, they are entitled to education based on the old programme as preparation for the associated tests, for the duration of the transition period. During that period, they are also entitled to sit the associated tests.

If they do not complete the entire unit of study within the transition period, they will have to attend the replacement classes instead, and sit the replacement tests.

The following tests will no longer be included in the 2022-2023 curriculum. The last resits will take place in 2022-2023 for:

Year	Unit of study	Unit of study code	Test	Test code	Last year in programme	Last year resit
1	Routing	1917IN142Z	Routing (CCNA2)	1912IC141A	2022-2023	23/24
1	Routing	1917IN142Z	Routing Practical	1916IC141B	2022-2023	23/24

If an expiry date has an associated transition period, the tested knowledge, understanding or skills may be demonstrably obsolete. If this is the case, it will be stated under the module or unit of study in question.

Students who had already completed this component of the unit of study must bear in mind that their test results will have limited validity. See also Article [146. Limited validity period for tests and exemptions](#) and following.

If students do not succeed in completing the entire programme within the validity period applicable to them, they will have to attend the replacement classes instead, and sit the replacement tests.

### 24. Evaluation of the programme

The faculty works with two quality cycles whom both consist of four steps of Plan-Do-Act-Check (PDCA).

The 'small' quality cycle focuses on monitoring and improving the results per educational term or semester. (four or two times per academic year). After every term the teaching staff as well as the students discuss their analyses and points of improvement.

The 'large' quality cycle focuses on the integration of the different evaluations conducted in one academic year. It integrates the evaluations of the students, workfield, alumni and employees. and gives an overview of all these results.

## 4 PART 4. ADMISSION

### Chapter 1. Admission to the foundation phase

#### 25. General rules of admission

The rules on admission to the foundation phase are set out in the [Rules on enrolment and deregistration](#) of Inholland University of Applied Sciences. This document can be found on the website and on Iris and is briefly discussed in Chapter 2 of this Education Guide. If prescribed by the WHW, these rules are included in the Rules on enrolment and deregistration. This applies at any rate to:

- the entrance examination;
- the examination for persons aged 21 years or older who do not meet the admission requirements (21+ examination);
- the prior education and entrance requirements for students who do not come from a country in the European Economic Area (EEA);
- the requirements for enrolling in a programme that will be partly or entirely taught in the English language.

#### 26. Admission following an interruption in enrolment

Students whose programme was interrupted by deregistration and who wish to re-enrol must ask the programme upon re-enrolment which results they have already achieved and to what extent these fit in with the programme as it applies at the time of re-enrolment.

The programme will let these students know in writing what additional classes and tests they must take to match up with the tests they have passed and which exemptions they have. The students must also comply with the other rules for enrolment and deregistration.

Enrolment for a programme that is being phased out is not possible.

#### 27. Admission to a part-time programme

The programme has no part-time form.

#### 28. Admission to a dual programme and work-study agreements

The programme has no dual form.

### Chapter 2. Admission to the main phase

#### 29. Admission to classes and tests in the main phase with a foundation certificate awarded by Inholland

To be admitted to the main phase, students need either a foundation certificate from the programme or a joint foundation phase exam that also applies to the programme. The faculty director may determine in this respect that a student will not be admitted to one or more specialisations or main subjects. More information is provided in Article [38. Exclusion from main subjects or specialisations](#).

Generally speaking, admission to the main phase means that students are admitted to all units of study and tests. However, for some units of study additional conditions apply before students can take classes or sit tests. More information is provided in [article 31a](#). Students must meet these conditions before they can take part in those units of study.

Careful thought has been given to the structure of the curriculum and the order of the units of study. However, students are not required to follow this order.

### 30. Admission to the main phase with a foundation certificate awarded by another institution of higher professional education

If students have a foundation certificate from another institution of higher professional education, the Examination Board will assess for which units of study they may be offered an exemption or whether they can start the main phase straight away.

The Examination Board will make its decision within 30 working days after receiving a complete request.

### 31. Admission to main phase classes and tests without a foundation certificate

If the student does not yet have a foundation certificate and has also not met the binding study recommendation standard, they can still attend the units of study in the main phase/the second year. If special conditions apply to participation in a unit of study, students can only attend the unit of study if they meet these conditions.

#### 31.a Entry and transfer requirements for units of study from the second year

In order to participate in the Code Generation Project (2.4), the student must complete the Building applications Project (1.4) sufficiently.

See articles 35 and 36.

## Chapter 3. Switching

### 32. Switching between forms and variants

Switching between forms and variants within a programme is allowed. Students must comply with the conditions for admission and enrolment that apply to the form or variant to which they wish to switch.

The Examination Board will determine how students' test results and exemptions will be incorporated into the form or variant to which they are switching.

### 33. Switching between programmes with a joint foundation examination

With a joint foundation exam, students are enrolled in one specific programme, and their results are recorded towards that programme.

If students switch to another programme with the same joint foundation exam before completing their foundation phase, they retain their results and exemptions from the foundation programme. These are transferred to the new programme, with the dates on which the results were achieved being maintained.

If students switch programmes after receiving a foundation certificate, no new foundation certificate will be awarded for the new programme.

Any warnings issued as part of the binding study recommendation remain applicable after a switch.

If students have received a binding study recommendation for one of the programmes with a joint foundation exam, they cannot switch to another programme with the same joint foundation exam.

### 34. Switching between Ad and Bachelor's programmes

Students cannot switch from an Ad programme to the Bachelor's programme.

## Chapter 4. Admission to work placements and graduation programmes

### 35. Work placements

Students require permission from the programme to be able to start a unit of study that includes a work placement component. Permission is granted through the signing of a placement contract by or on behalf of the faculty director.

If other conditions apply to participation in the unit of study, students must meet these as well before they can participate. The

programme deals with these conditions with leniency.

In Week 4 of the term prior to the term in which students are due to start their internships, steps will be taken to establish whether or not they have met the conditions for participation in the internship. To be able to start the internship, the following entry requirements must have been met by this reference date:

- A minimum of 90 credits has been attained;
- Passed the Interview and Reporting Test (1918IN131B);
- The projects (group work) that fall in the same term as the internship have been completed successfully.

Students will be able to start their internship in any term, provided they meet all of the entry requirements by Week 4 of the previous term. The reference period for anyone wanting to start an internship in Term 1 is Week 4 of Term 4.

If you want to go on Internship even though you do not meet all the conditions you can contact the Internship coordinator. In special circumstances you can submit a request with sufficient arguments to go on Internship. The Internship coordinator will discuss your request with the head of department and together they will make a decision. If you do not agree with their decision you can submit a request to the Exam Board.

#### *Exception for Term 5*

Students who have obtained a minimum of 100 credits by the end of the academic year (term 4) may lodge a request with the committee prior to week 1 of term 5 in which they explain why they want to start their internship in term 1. The placement committee will make a decision in Week 1 of Term 5.

No supervision will be provided in Term 5. This means that the internship will take place in Term 4 and Term 1 of the next academic year if a student starts his internship in Term 4.

### **36. Graduation programmes**

Students require permission from the programme to be able to take a unit of study that is part of a graduation programme. The graduation programme consists of units of study with one or more graduation products.

To start the graduation programme, the following admission requirements apply:

- The propaedeutic phase has been passed
- The 3rd year internship has been successfully completed.
- A minimum of 185 ECs were obtained in week 3 of the period prior to the start of graduation.

If you want to go on Graduation Project even though you do not meet all the conditions you can contact the Graduation coordinator. In special circumstances you can submit a request with sufficient arguments to go on Graduation Project. The Graduation coordinator will discuss your request with the head of department and together they will make a decision. If you do not agree with their decision you can submit a request to the Exam Board.

## **Chapter 5. Admission to optional subjects, main subjects and specialisations**

### **37. Optional subjects**

In semester 2 of year 3 you can choose between:

- User Experience (period 3) and Security (period 4)
- Big Data & AI (period 3 and 4)

In semester 1 of year 4 you can choose between:

- Mobile Development (period 1 and 2)
- Cloud Computing (period 1 and 2)

### **38. Exclusion from main subjects or specialisations**

Students select a main subject and specialisation from the range offered by their programme. However, the faculty director may



decide not to allow a student to take a main subject or specialisation, if differences in the nature and content of that main subject or specialisation justify such a decision.

In making the decision, the faculty director takes into consideration the study results, the programme as followed by the student, or both, and the relationship between these and the content of the main subject or specialisation.

### 39. Participation in more than one main subject or specialisation

If students wish to participate in more than one main subject or specialisation, they must indicate in advance to the Examination Board for which main subject or specialisation they wish to take the final examination. The choice for one particular graduation track is specified on the certificate. The other choice is extracurricular. This means that this choice is not part of the programme itself. Specialisations are not reported on the certificate. All units of study that the students have successfully completed will be included in the list of grades and the diploma supplement.

## Chapter 6. Admission to optional subjects

### 40. Optional subjects

The programme offers the following options:

- electives Mobile Applications and Cloud (4th year)
- electives Big Data & AI, UX and Security (3rd year)

The descriptions of the programme's elective units are included at the end of this chapter.

The conditions for participating in the electives are:

- Propedeeuse achieved.
- Internship in the third year achieved.

The electives (15 or 30 EC) are offered both in year 3 and year 4. These may be followed as part of our own programme or as part of one of the associated programmes. Students may take at most 30 EC of electives at an associated programme. If students wish to take 30 EC of electives outside of their own programme, they must write a plan in consultation with their study supervisor and submit it to the Examination Board for approval. This plan must explain how the student intends to achieve the competencies of a Bachelor of ICT at the Competent to Start level.

A minor at another University or University of Applied Sciences must meet the following criteria:

- The chosen minor is a coherent package of 15 EC or 30 EC [You choose the entire package and cannot choose individual components]
- The student must choose at least 30 EC from the minors offered by our study programme. The student can therefore complete a maximum of 30 EC outside the study programme.
- Only fully completed external minors can be entered into the grading system.
- The external minor are at least Bachelor level 3.
- The external minor must have added value in relation to the chosen (or to be followed) minor(s) of the own study programme.
- In the case of an external minor, the student must be able to justify in a letter of motivation how the minor contributes to his/her own professional development as an intended ICT professional.
- The student can submit a maximum of 1 application for an external minor to the Board of Examiners at a time.

Within our own programme, the major consists of elective units and the individual graduation research which is linked to a complex professional situation. This graduation research must be aligned with the chosen electives. The completed major will be noted in the supplement to the student's diploma.

### 41. Optional subjects package

Optional subjects will be offered as a package because this is necessary to achieve the final qualifications (learning objectives) for

the programme. The students are required to select the entire package.

The name of the package only appears on the list of grades and the diploma supplement, if students have completed the entire package.

#### 42. Exemption and substitution of optional subjects

Students can request an exemption from the Examination Board if they have taken certain tests as part of another programme. In this case, they must choose an optional subject first and then apply for an exemption. [Chapter 18. Exemptions](#), particularly Article [160. Exemptions procedure and evidence](#), contains more information about how students can apply for exemptions and the requirement that they must state the reasons why they need an exemption.

Students can also request the Examination Board to grant them permission to take other units of study that allow for national and international mobility. These are known as 'substitute units of study', as explained in Article [167. Request for substitution](#) and following Articles.

#### 43. Permission by the Examination Board for optional subjects

If students choose an optional subject that is not offered by their own programme, they must first discuss the choice with their study counsellor.

They must then submit a request to the Examination Board. In the request, they must indicate:

- how the choice aligns with the profile of their programme in terms of final qualifications (learning objectives) and level;
- how the choice relates to the phase of the programme in which they are making the choice;
- how the choice fits in with their personal goals.

The Examination Board will make a decision within fifteen working days.

#### 44. Changing a selected optional subject

Students can change their choice of optional subject at any time up until five weeks at the latest before the start of term. To do so, they must repeat the procedure set out in Articles [42. Exemption and substitution of optional subjects](#) and [43. Permission by the Examination Board for optional subjects](#).

#### 45. Extra optional subjects

Students can obtain extra credits by taking more optional subjects than provided for in the graduation programme. In this case, they must let the Examination Board know which units of study are extracurricular. These units of study do not form part of the final examination.

Students who choose to take extra optional subjects are recommended to take note of the provisions of Articles [175. Degree certificate](#) and [177. Deferral of awarding of the degree certificate](#) when deciding on the order in which to complete the optional subjects. These articles determine when a degree certificate will be awarded and when the awarding of the certificate will be postponed.

# 5 PART 5. APPLYING FOR UNITS OF STUDY

## Chapter 1. Applying for units of study in the basic curriculum

### 46. Applying for units of study

Students do not need to apply to take units of study in the basic curriculum. However, applications are sometimes necessary for the organisation of the programme, for instance in the case of field trips. Where an application is required, it will be stated in the unit of study description.

Students will be informed as quickly as possible as to whether they can take the units of study for which they have applied. They will receive this information at least two weeks before the unit of study is due to start.

If there are more applicants than places, students will be placed in the order in which they applied. Students for whom the unit of study is an integral part of their basic curriculum will be given preference ahead of students for whom this is not the case.

Students who cannot be placed will be offered an alternative option.

## Chapter 2. Applications and placement for optional subject

### 47. Applying

Students must apply in good time to take optional subjects.

The information provided on optional subjects will specify how and when students can apply.

If a minimum number of students is necessary in order for an optional subject to go ahead, this will be announced in advance. Students will also be notified in advance if there is a cap on student numbers for an optional subject.

Students who were previously admitted to an optional subject but did not start it must apply again, stating 'previously admitted' as their reason.

### 48. Placement

Students who apply for optional subjects in good time and according to the correct procedure will be placed in those optional subjects, unless there are too many or too few applications. For Study Abroad, other guidelines apply for the placement. For more information, check the student handbook Study Abroad, [31.a Entry and transfer requirements for units of study from the second year](#), [37. Optional subjects](#) or article [40. Optional subjects](#).

At least six weeks before the start of term, students will be notified whether they have been placed in their optional subjects. If they have not been given a place, they will be notified of the reasons for this, and also how and within what timeframe they can make a new choice.

Note: Placement alone is not always in itself sufficient for a student to be able to take a unit of study. If other conditions apply for participation in the unit of study, students must meet these too.

### 49. Too few applications

If fewer than the minimum number of applications are received, the faculty director responsible for that optional subject may decide not to allow the unit of study to go ahead. In that case, the faculty director will offer the students who applied for the optional subject one or more alternative options. Where possible, this will include the option of taking the same or a similar optional subject at another location.

### 50. Too many applications

If too many applications are received, students will be placed in the order in which they applied. Applications for optional subjects that are not extracurricular will be given priority. See also Article [45. Extra optional subjects](#). The faculty director will offer students who are not given a place one or more alternative options. This may include the option of taking the same or a similar optional subject at another location.

For Study Abroad, other guidelines apply for the placement. For more information, check the student handbook Study Abroad, [31.a Entry and transfer requirements for units of study from the second year](#), [37. Optional subjects](#) or article [40. Optional subjects](#).

# 6 PART 6. STUDY COUNSELLING

## Chapter 1. Study counselling

### 51. Mandatory component of the programme for all students

Every student will receive study counselling and have a study counsellor.

Study counselling is a mandatory component of the programme. It is related to the student's academic phase. It is also possible to receive advice and counselling regarding personal circumstances – see the [Student Counsellor page](#) on Iris.

### 52. Content of study counselling

At a minimum, study counselling includes:

- guidance on choices during students' studies;
- academic progress;
- the study recommendation.

Students can view their own academic progress electronically.

Within study supervision (SS), all students learn how to manage their own academic career. They learn to recognise and utilise their strengths, get to know their limitations (through feedback and reflection) and become able to create a personal development plan. Discussions cover study progress, development of competencies, choices and any factors inhibiting study. The student supervisor plays a supporting role in this. However, students are responsible for their own learning process and are expected to have a proactive attitude.

In this context, the following points are important:

- Students discuss their study progress with their study supervisor.
- Students take a result-oriented approach to their work. Once learning goals and activities have been established, concrete arrangements can be agreed with the study supervisor.
- Students 'learn to learn'. They have an understanding of their own learning style, they know what drives them (and what doesn't) and are able to plan efficiently.
- Students take responsibility for their own learning process and the choices this entails. This includes the choice of an internship position, graduation project, etc.
- Students reflect critically on their own performance and developing level of competence. Based on this, viable learning goals may be set enabling better planning of activities.

Study supervision runs throughout the four years of study. There are two manuals: one for the propaedeutic phase and one for the main phase.

The study supervisor keeps a record of the assignments as described in the manual. To meet their SS requirements, students must attend the compulsory individual discussions and complete the assignments, as defined in the SS manual, to the satisfaction of the study supervisor. Together with the various deliverables produced during the study, the collected assignments make up the students' portfolio. This is how they demonstrate their competence development over four years of study.

Students who receive a BSA warning have a meeting with the study supervisor to discuss any circumstances inhibiting their studies and, if appropriate, to establish an action plan in order to eliminate the backlog.

## Chapter 2. Recording data as part of study counselling

### 53. Recording data in study counselling

For each student, the study counsellor will record the agreements made during study counselling sessions. For disabled students, the study counsellor will also record the relevant agreements they have made. The same applies to agreements with students enrolled as elite athletes.

Students will be given a copy of these agreements on request. For disabled students, more information is given in Article [107. Disability](#) and for elite athletes in Article [66. Adjusted standards for elite athletes](#) and Chapter 2 of this Education Guide.

Students are entitled to view the information recorded about them.

# 7 PART 7. STUDY RECOMMENDATION AND BINDING

## STUDY RECOMMENDATION

### Chapter 1. Study recommendation

#### 54. Content of study recommendation

At the end of the first year of enrolment in the foundation phase of the Bachelor's programme or the Ad programme, students receive a positive or deferred study recommendation in writing from the faculty director relating to the continuation of their studies within the programme or elsewhere. This study recommendation is based on the test results recorded in the PeopleSoft academic monitoring system.

Where necessary, the study recommendation will include a warning or a rejection. More information on a warning is given in [77. Warning](#), and more information about rejections is contained in Articles [56. Quantitative academic performance standard](#) to 63.

The study recommendation applies to all forms and variants of the programme. If a student switches from one form or variant to another and the programmes are different, the faculty director will adjust the study recommendation after the switch if necessary.

#### 55. When study recommendations will be issued

The student who enrolled in September will receive the study recommendation by 31 July at the latest. The student who enrolled in February will receive the study recommendation at the latest by the first of March of the second year of enrollment.

The study recommendation contains a recommendation of the first twelve months of the study, to and including 31 January.

Students who enroll on any other date than 1 September or 1 Februari will receive their study recommendations:

- at the latest on 31 July 2023 for cohort 21-22 and cohort 22-23 if they started in the September intake;
- at the latest on 1 March 2024 for cohort 20-21 and cohort 22-23 if they started in the February intake.

The standards for the study recommendation are set out in Article [67. Different standard for interim entrants](#).

### Chapter 2. Binding study recommendation in the first year of enrolment

#### 56. Quantitative academic performance standard

##### a. Level of the quantitative academic performance standard

At the end of the first year of enrolment in the programme, students must have obtained at least 45 of the 60 available credits in the foundation phase. When students have obtained at least 40 credits, of which 25 credits in period 3 and 4, the quantitative standard has been met. Please note: this is a pilot.

##### b. Quantitative academic performance standard where exemptions have been granted

If students have been granted exemptions from the tests for one or more units of study, the quantitative academic performance standard will be 84% (50/60) of the remaining number of credits in the foundation phase. This rule also applies to the accelerated

curriculum for students with a pre-university education.

If the student has exemptions, 75% of the remaining units of study must be passed. This is rounded up to whole credits.

#### 57. Qualitative academic performance standard

The programme has no qualitative standard for the binding study recommendation.

#### 58. Issuing of binding study recommendation

Students must meet the quantitative academic performance standard by the end of the first year of enrolment. If the programme has set a qualitative academic performance standard, students must also meet that standard. If students meet the academic performance standard by the end of the first year of enrolment, they will receive a positive binding study recommendation. If students do not meet the academic performance standard by the end of the first year of study, the binding study recommendation will be postponed. Students from cohort 2021-2022 will have the opportunity until 31 July 2023 (September intake) or 1 March 2024 (February intake) to meet the academic performance standard as set out in article 61. No advice from the student counsellor is required in this respect.

#### 59. Binding study recommendation and personal circumstances

The faculty director will not issue binding study recommendations where students have not been able to comply with the standards for binding study recommendations due to personal circumstances. The procedure for providing evidence of personal circumstances is set out in Articles [82. Personal circumstances](#) and [85. Definition of personal circumstances](#).

If the programme has set a qualitative academic performance standard and the student has not achieved that standard, and if the personal circumstances which prevented the student from achieving the quantitative academic performance standard did not present an obstacle to meeting the qualitative standard, the faculty director will always issue a negative binding study recommendation.

#### 60. Binding study recommendation and switching out of the accelerated variant

This article does not apply to the programme B Information Technology.

## Chapter 3. Binding study recommendation after the first year of enrolment

#### 61. Standard for a binding study recommendation after the first year

If a student did not meet the minimum standard (quantitative and possibly qualitative) at the end of the first year and the faculty director could not provide a binding study advice, then they must pass the entire first-year program during or by the end of the second year of enrollment or within the given deadline.

This applies to students:

- For whom a binding study advice could not be given due to personal circumstances;
- Who did not receive a binding study advice because their enrollment was interrupted. See also article [69. Binding study recommendation following an interruption in enrollment](#);
- Who had a significant backlog for the first time at the end of the fourth educational period, and it became apparent that there was a backlog. See also article [77. Warning](#);
- Whose examination results after the first year clearly indicate the student's suitability. See also article [62. When a binding study recommendation will be issued after the first year](#).

#### 62. When a binding study recommendation will be issued after the first year

The faculty director will issue a binding study recommendation upon determination that the student cannot successfully complete the remainder of the first-year programme within the timeframe granted to the student.

The faculty director will not give a negative binding study recommendation if there are personal circumstances; see also Article [82. Personal circumstances](#). It is necessary that the student counsellor issues advice.



The faculty director will give a positive recommendation if the test results for the programme after the first year clearly indicate the student's suitability.

### 63. Extending the timeframe

It is possible that, due to personal circumstances, a student may not receive a binding study recommendation during or at the end of the second year of enrolment but will instead receive a warning stating a timeframe. If it subsequently becomes apparent that the student is unable to meet the standard within that timeframe, the faculty director will issue a binding study recommendation at the end of the timeframe specified in the letter. If relevant personal circumstances still exist, the faculty director will again take the severity of these circumstances into account. See also Article [82. Personal circumstances](#).

## Chapter 4. Consequences of a binding study recommendation and when enrolment will end

### 64. Termination of enrolment

Students who have received a binding study recommendation from Inholland cannot continue with the programme. Their enrolment will be terminated.

### 65. When the enrolment will end

If a binding study recommendation is issued after 1 June, the enrolment will end on 31 August.

If a binding study recommendation is issued earlier in the academic year, the enrolment will be terminated at the time immediately after the end of the last day of the month in which the binding study recommendation was issued. If there are only a few days remaining between the issuing of the recommendation and the last day of the month, the student's enrolment will be terminated one month later.

## Chapter 5. Special cases and binding study recommendation

### 66. Adjusted standards for elite athletes

An elite athlete is a student who meets the conditions set out in the Profile Fund Regulations. These regulations can be found in this Education Guide in Chapter 3.3.

In addition to the provisions of Article [85 h](#), the faculty director may make an agreement with an elite athlete setting adjusted standards for the first year of enrolment. This will be done as soon as possible after enrolment. The faculty director will send the student a letter setting out the agreements. The faculty director may appoint someone else to make the agreements and send them to the student.

### 67. Different standard for interim entrants

There is no different standard for interim students.

#### Quantitative academic performance standard

The faculty director will determine which credits the student will be unable to achieve upon entering in the interim, in light of the scheduling of the classes and tests. This number will be deducted from the first-year study load. (The first-year study load is 60 credits for the regular programme and 45 for the accelerated variant.) The student must achieve 84% of the difference in the first year of enrolment. This number will be rounded up.

If the student has exemptions, the percentage will be applied on the total number of credits minus the number of credits for the units of study for which the student has exemptions, and minus the number of credits that the student will be unable to achieve due to the scheduling of classes and tests. This number will be rounded up as well.

### Qualitative academic performance standard

If there is a qualitative academic performance standard, the number of credits for the units of study that form part of the standard and that the student cannot achieve due to entering in the interim will be deducted from that standard.

Soon after the intake, the faculty director will determine what the quantitative and qualitative academic performance standards will be. The faculty director will consult the student first, and then send the student a letter setting out the standards.

### 68. Binding study recommendation and switching to another programme

If students switch to another Bachelor's programme or Ad programme, the rules of the binding study recommendation will again apply to the new programme.

**Important note:** After receiving a binding study recommendation, students cannot switch to a programme with the same foundation exam. It is also not possible, after having received a binding study recommendation, to switch from an Ad programme to a Bachelor's programme (or vice versa) with the same foundation exam. The standards for binding study recommendations are set out in Article [56. Quantitative academic performance standard](#) and [57. Qualitative academic performance standard](#).

After receiving a binding study recommendation, students cannot transfer credits that they obtained in the old programme to the new programme. However, they can apply to the Examination Board for an exemption from tests if they meet the applicable conditions. See also Articles [155. Exemptions from tests](#) to [162. Waiving further investigation](#).

### 69. Binding study recommendation following an interruption in enrolment

Students who are deregistered less than two months after enrolment and re-enrol in the same programme in a subsequent academic year will be subject to the same rules around warnings and binding study recommendations as students enrolling in the programme for the first time.

If a student from the September intake terminates their enrolment before receiving a binding study recommendation and then re-enrols in a subsequent academic year, the binding study recommendation standard entails that they must pass the foundation examination in that year. When they enrol, the student will receive a warning notifying them of this fact.

If a student from the February intake terminates their enrolment before September of that year and then re-enrols in the same programme on 1 September, generally speaking the same rules will remain applicable to them regarding warnings and binding study recommendations. The quantitative academic performance standard may be adjusted in individual cases. If this is the case, it will be stated in the warning that the student receives at the time of re-enrolment.

If a student deregisters before the end of the academic year, and they could not have met the BSA standard anymore even if they hadn't deregistered, and if there are no personal circumstances as referred to in Article [85. Definition of personal circumstances](#), then a binding study recommendation will be issued.

The rules in this Article also apply if a student re-enrols for a programme with the same foundation exam as the programme in which they were previously enrolled.

## Chapter 6. Academic progress and international students

### 70. Students to whom these rules apply

The rules in the following Articles (up to and including Article 75) concerning academic progress apply to students who:

1. do not come from a member state of the [EEA](#) or from Switzerland (these are students who require a residency permit); and
2. are covered by the 'Code of Conduct for International Students in Dutch Higher Education'.

These rules are in addition to:

- the rules on academic progress, study recommendations and binding study recommendations in this TER; and
- the academic progress requirements for students who receive a knowledge grant from the university under the Profile Fund Regulations.

### 71. Criteria

According to the Code of Conduct, students have made satisfactory academic progress if, in each academic year, they have achieved:

- at least 15 credits by participating in tests in the first two terms;
- at least 30 credits over the entire academic year.

### 72. Procedure at the end of Term 2 and Term 4

The faculty director determines students' academic progress twice each year:

- at the end of Term 2;
- and at the end of Term 4.

If a student is deemed to have made unsatisfactory academic progress after Term 2 and at the end of the academic year, their study counsellor will discuss this with them. If there are any special circumstances as referred to in Article [86. Other special circumstances](#), the study counsellor will make a reasonable agreement with the student to ensure that their academic progress is restored to the required level as quickly as possible. The student is required to comply with this agreement.

### 73. Procedure at the end of the academic year

If at the end of the academic year the faculty director finds that a student is no longer attending any classes at all, or their abilities are insufficient for the level of the programme, the university will report the student to the Immigration and Naturalisation Service (IND) within one month. The 'end of the academic year' is always the end of July/August, even for students from the February intake. If a student is failing to meet the progress standard that applies to them, this will be sufficient reason for determining that their abilities are insufficient for the level of the programme. This does not apply if the study counsellor has made an agreement with the student as described in Article [72](#). The faculty director will inform the student in a letter of his decision regarding the special circumstances relating to their failure to meet the required standard. This letter will include the faculty director's reasons, as well as information on how the student can appeal against the decision.

### 74. The university will refrain only once from reporting a student

Where the same set of special circumstances is involved, reporting an international student to the IND for unsatisfactory academic progress can be refrained from only once during the entire period in which the international student is enrolled at the university. The Central Student Administration makes the report on behalf of the faculty director.

### 75. Records

The faculty director makes a record of:

- the unsatisfactory academic progress;
- the personal circumstances; and
- the fact that no report was made.

## Chapter 7. Procedure for issuing binding study recommendations

### 76. No binding study recommendations without prior warning

The faculty director must first give the student a written warning before issuing a binding study recommendation.

### 77. Warning

If a student's academic progress has been unsatisfactory during their first or second year of enrolment in the foundation phase, and as a consequence they are in danger of receiving a binding study recommendation, the student will receive a warning from the faculty director. The warning will be given in writing.

### 78. When the warning will be sent

The faculty director sends the warning in the first year during the term in which the students' poor academic progress is first noted, or as soon as possible after the end of that term.

If the faculty director only notices students' poor academic progress in Term 4, and is unable to issue a warning due to the resits at the end of that term, the students will receive a warning that they must successfully complete the full first-year curriculum in the second year of enrolment. The warning will form part of the study recommendation.

If a student cannot meet the standard for avoiding a binding study recommendation due to personal circumstances, they will receive a warning that the foundation phase must be successfully completed during or by the end of the second year. The warning will form part of the study recommendation.

### 79. Content of the warning

The warning will indicate the total number of credits that the student must obtain. The warning will also indicate the date by which the student must have obtained these credits.

The terms in which classes for the units of study in question will be run, and the timing of the tests, are taken into account upon setting this date. The rule is that there should be two test opportunities per academic year, unless one of the exceptions in [96. Number of test opportunities per academic year](#)

If the student is subsequently given a new deadline due to personal circumstances, this applies only to the two test opportunities for the remaining units of study.

### 80. Scope of the warning

The warning applies to all forms and variants of the programme.

In the case of a joint foundation exam, the warning applies to all programmes with the same foundation exam.

If the programme is run in multiple locations, the warning applies to all locations.

However, if students switch from one form, variant or location to another, and the curriculum is different, the warning may be adjusted if necessary. If such an adjustment is made during the first year of enrolment, only the standard will be adjusted.

### 81. Warning in the case of re-enrolment following deregistration

If a student does not receive a warning because they have already deregistered, and if they re-enrol in the same programme, or in a programme with the same foundation examination, they will receive the warning as soon as possible after re-enrolment.

The standards for a 'Binding study recommendation following an interruption in enrolment', as described in Article [69. Binding study recommendation following an interruption in enrolment](#), will apply to the warning.

### 82. Personal circumstances

Students may fall behind in their studies due to personal circumstances. Article [85](#) outlines what those personal circumstances might be. The faculty director takes any personal circumstances into account when deciding whether to issue a binding study recommendation. The faculty director can only do this if he or she is aware of the personal circumstances. Accordingly, students must report personal circumstances to the student counsellor. The faculty director will always seek advice from the student counselling service before issuing a binding study recommendation. The student counsellor will provide written advice. In the advice, the student counsellor will address:

- whether the student has reported personal circumstances as defined in article [85. Definition of personal circumstances](#);
- if so, whether the student has delivered proof of the personal circumstances;
- whether the student counsellor can establish a connection between the personal circumstances and the study credit deficit of the student;
- if possible, for how many study credits the student has fallen behind due to the personal circumstances and/or which period or courses the deficit relates to.

The student counsellor will send the advice to the faculty director and to the student. The faculty director will also consult the

study counsellor about students' academic progress and its connection to their personal circumstances.

### 83. Meeting

Before a binding study recommendation is issued, students will be offered the opportunity to explain their side of the story to the faculty director or to someone else assigned to meet with students on behalf of the faculty director. Among other things, this meeting will include a discussion of whether the overview of academic results achieved is accurate. The participants of the meeting will also look at whether the personal circumstances should be taken into account.

If a student fails to take up an invitation to attend such a meeting, this will be noted in their student file.

## Chapter 8 Request for lifting a binding study recommendation

### 84. Lifting

Students who have received a binding study recommendation may submit a request to the faculty director to review the rejection.

Such review by the faculty director can take place no earlier than twelve months after the date on which the enrolment was terminated due to the binding study recommendation. In their request, students must provide plausible arguments to show that they will now be capable of successfully completing the programme. These arguments can be based by the students on activities, which may include studies, that the students have engaged in since leaving the programme.

The faculty director will not review the rejection if the programme is being phased out or has been discontinued.

## Chapter 9. Special and personal circumstances and academic progress

### 85. Definition of personal circumstances

The personal circumstances that can play a role in the decision of whether to issue a binding study recommendation as described in Article [82. Personal circumstances](#) are:

- a. student illness;
- b. physical, sensory or other disabilities;
- c. pregnancy of the student;
- d. special family circumstances;
- e. membership of a representative advisory council, faculty representative advisory council, student committee or programme committee at the university;
- f. membership of an accreditation committee, as specified in Chapter 5a of the WHW;
- g. membership of the board of a student organisation or other administrative activity, as explained in Article 2(3) of the Profile Fund Regulations, which can be found in the Education Guide;
- h. competing as an elite athlete (see also Article [66. Adjusted standards for elite athletes](#));
- i. personal circumstances not listed in (a) to (h) above, which, if the board of the university did not take them into consideration, would lead to a significant and unfair disadvantage.

### 86. Other special circumstances

In addition, the following provisions concerning the academic progress of international students (Articles [70. Students to whom these rules apply](#) to [75. Records](#)) and the validity period of results (Articles [146. Limited validity period for tests and exemptions](#) to [148. End of validity period](#)) apply:

1. a programme cannot be completed within the nominal time;

## 2. activities in the social sphere.

Students may also fall behind in their studies in a way that makes them eligible for financial assistance under one of the student financial support schemes as outlined in Chapter 3 of this Education Guide.

### 87. Procedure for establishing special and personal circumstances

#### *a. Notify the student counsellor as soon as possible*

If any of the circumstances set out in Articles [85. Definition of personal circumstances](#) or [68. Binding study recommendation and switching to another programme](#) arise and cause a student to fall behind with their studies, they should notify the student counsellor as soon as possible, stating:

- the period of time for which the circumstances applied or will apply;
- what the circumstances are and how serious they are;
- the student must provide evidence; the extent to which the student was or will be unable to participate in classes or tests.

All contacts with students are recorded in the student counselling information system. If students so wish, they can obtain a copy of everything recorded in the system about these contacts.

#### *b. Student Counsellor's Declaration*

The student counsellor will draw up a 'Student Counsellor's Declaration' if:

- a student has proven that personal or special circumstances are applicable; and
- the student counsellor has determined that the student has fallen behind or is likely to fall behind in their studies due to these circumstances.

This declaration will specify the date of the first meeting about the circumstances and all matters listed under (a) above. The student counsellor may also include comments, advice and arrangements for the student or for discussion with the study counsellor.

Some circumstances are confidential. If so, the student counsellor will discuss with the student what will be included in the declaration.

#### *c. Discussion with study counsellor and adjustment to study plan*

The student will show the Student Counsellor's Declaration to their study counsellor and discuss with the study counsellor the inability to keep up with their studies and any advice they have been given. The student will then adjust their study plan. The discussion and adjustment to the study plan will take place as soon as possible after the meeting with the student counsellor.

If the student involved is an international student, the study counsellor will also talk about the IND's progress requirements. See also Article [73. Procedure at the end of the academic year](#).

#### *d. Request for special arrangement*

Based on special circumstances, a student in possession of a Student Counsellor's Declaration or advice from the student counsellor, may request special arrangements at the Examination Board, the programme or the service organisation.

### 88. Confidentiality of personal circumstances

Everyone who is aware of a notification of personal circumstances:

- will handle the information in a confidential manner; and
- will use the information only as part of their duties and for the purpose of implementing the regulations in the Education Guide.

The student counsellor complies with the code of conduct for student counsellors and will give information to the programme only:

- within the scope of the student counsellor's role;
- within the parameters of the agreements the student counsellor made with the student about the confidentiality of the information.

## 8 PART 8. TESTS

### Chapter 1. Content and administration of tests and publication of test standards

#### 89. Connection to unit of study

The final qualifications or learning outcomes and the goals for each test are connected to the unit of study described in attachment "Description units of study", or to a module within that unit of study.

The project task or test questions will clearly and precisely state how students are expected to answer them.

#### 90. Test duration

Students will be given sufficient time to complete the test, according to reasonable benchmarks.

#### 91. Test standards

Test standards for practical work and group assignments are published prior to commencement of these assignments.

The test standards are published prior to publishing the test results.

### Chapter 2. Types of tests

#### 92. Types of tests

[11 Appendix: Annual Programmes](#) of the TER specifies the types of tests. There are three types of tests, which can be detailed in various ways:

1. Written  
Students answer test questions on paper or electronically, or they complete projects on paper or electronically.
2. Oral  
Students answer test questions in a meeting (online or physical) with one or more examiner(s).
3. Other  
For the test or project, students perform tasks that will be described clearly by the programme. Possibly a written, digital or oral component, or a combination of these, must also be completed.

If necessary, the type of test can be changed during the academic year, with due regard to the participation in the decision-making process. Students will be informed of this in a timely manner.

#### 93. Oral tests

##### a. One student examined orally at a time.

In an oral test (online or physical), one student is examined at a time, unless the Examination Board decides otherwise or if testing is conducted in a different manner. If so, this will be announced before the start of the unit of study.

##### b. Examiners and public access

Oral tests are conducted by two examiners. This may not be the case if it is not feasible from an organisational point of view, or if the test is administered online. In that case, the oral test must be recorded.

This will not be the case for the parts of a degree programme. These will be administered by two examiners. An oral test is open to the public, because that ensures transparency and allows for monitoring of the conduct of the test. This does not apply if the Examination Board decides otherwise.

#### c. Rules for conducting tests

Oral tests are conducted by two internal examiners, or by one internal and one external examiner. An external examiner is an independent expert from the professional field.

If an oral test (online or physical) is conducted by a single examiner, an audio or video recording is always made.

#### d. Protocol

For every oral test, a protocol will be drawn up. The examiners will sign the protocol. If an external examiner was involved in the test, he or she will also sign the protocol. The protocol will be preserved as specified in the university's regulations on retention periods.

If an audio recording of an oral test is made, it will be preserved as specified in the university's regulations on retention periods.

### 94. Other types of tests

#### Grounds

Disabled students can ask the Examination Board if they can complete tests in a way that accommodates their disability as much as possible. They can also request any additional or adapted materials they may need to be able to complete the test.

Students can also ask to complete tests in another form for other reasons. The Examination Board will only grant such requests in exceptional, individual cases.

Adjustments are possible only if they do not change the test goals or the level of the test.

#### Procedure

Students must request an alternative form of test by the start of term at the latest. They should submit their requests in writing to the Examination Board. The letter should set out the reasons for the request and enclose a copy of the advice received from the student counsellor ([Click here](#) for more information about advice from the student counsellor).

The Examination Board will make a decision as soon as possible, at any rate no later than fifteen working days after receiving the complete request.

## Chapter 3. Timing and frequency of tests

### 95. Timing of tests

Each unit of study will, if possible, end with one or more tests in the term in which the teaching was delivered. If the teaching was delivered over a whole semester, the test will, if possible, take place in that semester.

If a unit of study is composed of modules, the modules will likewise be completed, if possible, within the term or semester in which the unit of study was delivered.

The year programme states when the tests take place.

### 96. Number of test opportunities per academic year

For all tests of the programme in the form or variant as followed by the student, they will have two test opportunities per academic year, within normal term time. There are a number of exceptions to this rule. If there is an exemption, this will be set out in Schedule 1 of this TER.

- There may be only one test opportunity per academic year for tests *after the first year*, for which no resit can be scheduled in the same academic year due to the nature of the study unit. This applies, for example, to work placements in the fourth term.
- For some tests, the programme may indicate that students will be given more than two opportunities to complete them.



- The programme may also indicate that it will offer only one test opportunity in each academic year.

There are no exceptions in the number of test opportunities.

## Chapter 4. Resits

Note: The programme B Information Technology uses the test concept of programmatic assessment. We are not talking about resits, but about personalized recovery processes or remediation. Students are given the opportunity to demonstrate compliance with the set standard with additional evidence or documentation. The scope and the purport of the articles below do apply.

### 97. Timing of resits

The final resit opportunity in the first year will be scheduled before the end of Term 4. This is due to the fact that study recommendations need to be issued in time.

For tests which form part of the curriculum from the second year onwards (see the proviso in Part 7), resits can also be scheduled before the start of the new academic year. in other words, in Term 5.

### 98. Resit when test passed at first opportunity

Students who have passed a test are not entitled to a resit.

However, a student may want to resit a test in an exceptional situation. In this case, they must submit a request to the Examination Board, which will make a decision within thirty working days. If the Examination Board grants the request, the highest result that the student achieves will apply.

### 99. Additional opportunity due to special circumstances

In exceptional cases, the Examination Board may decide to provide an additional test opportunity.

This will only occur if personal circumstances exist as described in Article [85. Definition of personal circumstances](#), or in other extremely exceptional cases.

Students must submit a request to the Examination Board and state the reasons for their request. The Examination Board will seek advice from the student counsellor, if the Board deems this to be necessary. The Examination Board will make a decision within fifteen working days.

The programme offers no extra resits after 1 July for students in their first year. This is because these students will receive their study recommendation by 31 July 2024 at the latest.

### 100. Resits in the context of curriculum obsolescence and updating

Special rules apply to resits if a curriculum is obsolete or being updated. See Articles [21. Curriculum obsolescence and updating](#) to [24. Evaluation of the programme](#).

## Chapter 5. Bringing forward test opportunities

### 101. Bringing forward

An Examination Board may permit a student, on a one-off basis, to take one or more tests earlier, so that the student can pass the final examination without a disproportionate delay.

This is subject to the condition that bringing forward the test opportunity is reasonably possible.

If both test opportunities in the academic year have already passed, the student will be given a third test opportunity. The student must submit a request to the Examination Board and state the reasons for the request.

The Examination Board will make its decision within fifteen working days after receiving the complete request. The Examination

Board deals with these requests with leniency.

### 102. Conditions for bringing forward test opportunities

For a test opportunity to be brought forward, the student must meet the following conditions:

1. They must have a maximum of 10 credits left to obtain for a 240 credits programme, or a maximum of 7 credits for a 180 credits programme before completing the final examination.
2. For the obtaining of the remaining credits, the student is not subject to any attendance requirement for classes, nor is there any obligation to execute group projects.
3. The student cannot attend any classes or complete any tests in the next term or terms, due to the university's timetabling. This is based on the four ordinary terms of the academic year.
4. The student has:
  - attended the classes associated with the tests;
  - taken the tests concerned; and
  - tried to pass the tests with adequate preparation.

## Chapter 6. Time, place and duration of tests

### 103. Test timetable, testing room, materials

In the first two weeks of each term, the Service Point will publish the **test timetable** that the programme has set on Iris. If there are any changes to **testing rooms**, these will be announced at least two working days before the test date.

The programme arranges test dates so that they are spaced in an optimal way for students. The period of time in which a written or oral or test is taken is called a **test session**.

In the first two weeks of term, the examiner will publish a list of the **materials** that students may use in the test.

Students must also comply with:

- the rules concerning materials set out for the unit of study;
- the provisions regarding these rules in the test session instructions; and
- the instructions given by the Examination Board.

### 104. Deadline for submitting work

The test timetable will state the deadline for submitting work by the student other than in a test session. If this date is not stated in the test timetable, it will be announced in good time in another manner.

It will also be announced in advance what the consequences are if students do not submit work or do not submit it in a timely manner. This does not apply if this information is already included in attachment "Descriptions Units of Study".

### 105. Length of the test session

#### Written test

A written test session lasts a maximum of 180 minutes, unless the Examination Board has set a longer timeframe for a particular student.

#### Oral test

An individual oral test session will last a minimum of 15 and a maximum of 60 minutes. This does not apply if the nature of the test session makes a longer timeframe necessary. attachment "Descriptions Units of Study" indicates the length of each test session. If necessary, it also states the reason for the length of a particular test session.

## Chapter 7. Special test arrangements

### 106. Language deficiency

A student with a language deficiency who is following a Dutch-language programme can submit a request to the examination board for extra examination time and/or permission to use a dictionary during examinations. The examination committee can extend the test session by a maximum of 25% or 30 minutes. Tests lasting 60 minutes or less can be extended by a maximum of 15 minutes. More information about this is given in Chapter 2 of the Education Guide.

### 107. Disability

The Examination Board may decide to extend a test session for students with a disability by up to 60 minutes. They may also offer students additional auxiliary materials, or they may do both. Students must personally submit a request to this effect. Before the student submit a request, the student counselor must be asked for advice. The student counselor may draw up an advice per request by the student. The advice will be sent to the Examination Board. More information about the student counsellor can be found [here](#).

### 108. Alternative test time or location

In very exceptional circumstances, the Examination Board may allow students to sit a test at another time or in another location. A disability is an example of exceptional circumstances.

### 109. Submitting a request for special arrangements

Students must submit their requests for special arrangements in writing to the Examination Board at the start of term. If the exceptional situation does not arise until later, students must submit their request as soon as possible after the situation arises. Ideally, the Examination Board would then put the special arrangements in place for the current term. If that is not possible because a student has submitted their request too late, the Examination Board will put the special arrangements in place for the next term.

In their letters, students must explain the reasons for their request.

If a student has a disability, they must include an electronic or written opinion from the student counsellor. If the student counsellor has accepted a statement from an external expert, the student counsellor must state this in the opinion.

The Examination Board will inform students of its decision in writing at the latest within fifteen working days after the submission of a complete request.

## Chapter 8. Registering for tests

### 110. Which tests to register for

Students must register for tests each term within the designated registration period. Registration is necessary for:

- written test sessions; and
- tests for which students must submit work that will be submitted and assessed via the digital environment. This does not apply to situations where the programme does this on behalf of the students.

### 111. What happens if students do not register in time

Students who fail to register in time can still register at the Service Point in the week following the registration period. They will then be entered through the Service Point.

Without registration, students cannot participate. If students failed to register due to circumstances beyond their control, they must submit a request to the Examination Board as soon as possible, seeking permission to participate. Such requests must be in writing and must explain the reasons for the request.

The Examination Board will inform students of its decision in writing at the latest within fifteen working days after the submission of a complete request.

#### **112. Identical tests**

If students are enrolled for more than one programme at the university, and these programmes offer the same test, the registration will apply to both programmes. However, there will still be only two test opportunities per year. The result will be recorded under both programmes.

#### **113. Confirmation of registration**

Students will receive confirmation of registration. Such confirmation does not always mean that students may participate. They may participate only if they meet all of the conditions for taking part in the test. These include both the general conditions in this TER and the conditions set out in attachment "Descriptions Units of Study".

## **Chapter 9. Participation and attendance requirement**

#### **114. Participation in group work**

Students are required to actively participate in group work.

If a lecturer notices that a student is not cooperating and does not see any improvement despite encouraging the student to cooperate, the lecturer may tell the student that they can no longer participate in the unit of study or module. The lecturer must then report the student to the Examination Board as soon as possible. The Examination Board will make an official decision about whether the student may continue to take part in the unit of study or module.

Before the Examination Board makes its decision, it will give the student an opportunity to tell their side of the story. A report of this meeting will be drawn up.

If the teaching group, tutorial group or lecturer in question has not made sufficient effort to ensure that the student cooperates, the Examination Board can decide that the student may continue to participate. The Examination Board will make a decision within thirty working days.

#### **115. Attendance, active participation and/or preparation requirements**

If it is a requirement for a unit of study that students be present, actively participate and prepare in advance, the Examination Board may decide, on a proposal from the lecturer concerned, that a student may no longer participate. This may happen only if this is included in the description for the unit of study in the attachment "Descriptions Units of Study".

Before the Examination Board makes its decision, it will give the student an opportunity to tell their side of the story. A report of this meeting will be drawn up.

In exceptional cases, the Examination Board may determine that students are not required to be present for all or for certain classes or are not required to prepare all or part of the work. If so, it will set substitute requirements for these students. In such cases, students must submit a request to the Examination Board, which will make a decision within thirty working days.

#### **116. Consequences of a decision to exclude**

A decision by the Examination Board to exclude a student will prevent the student from participating in the next test for the unit of study in question, unless a different penalty is specified in the unit of study description.

## **Chapter 10. Assessment**

#### **117. Examiner(s)**

Every test will be graded by one or more examiners. The Examination Board determines who the examiners will be.

If a test is graded by more than one examiner, the Examination Board will designate one to be the primarily responsible examiner. The primarily responsible examiner consults with the other examiner(s) to decide on the grades and associated feedback. The primarily responsible examiner then communicates the grades and feedback to the students. This is always the case when grading units of study that are part of a graduation programme or of a component of a graduation programme.

#### **118. Grading procedure**

The examiner grades the work against the test standards published in writing prior to the test. Students have passed a test if the examiner determines that their written or oral work meets the requirements.

#### **119. Grading transparency**

Students must be able to see from the test standards and the grading procedure how their results were determined.

#### **120. Assessing work placements and graduation products**

The procedure for assessing work placements and the graduation programme parts will be documented in writing in a test protocol, together with the associated test forms.

Assessment of a unit of study that is part of a graduation programme or of a component thereof will be done by at least two examiners, unless the attachment "Descriptions Units of Study" states otherwise. The Examination Board may appoint an internal supervisor as an examiner, but not as the primarily responsible examiner.

The examiner, or where there are multiple examiners, the primarily responsible examiner, is responsible for the final grade awarded for the work placement and for the unit of study that is part of the graduation programme or a part thereof.

When assessing the work, the opinion of an external supervisor serves as advice to the examiner.

#### **121. Assessing the vocational component of dual-form programmes and work placements**

For dual-form programmes, the test protocol is appended to the work-study agreement so that the vocational component can be assessed. For work placements, the test protocol is appended to the work placement contract. The appendix contains the feedback and the opinion of the trainee supervisor on the student's performance. The trainee supervisor signs this document and sends it to the examiner.

The opinion of the trainee supervisor serves as guidance for the examiner who is responsible for the test.

## **Chapter 11. Grades and grading scales**

#### **122. Grading in points**

Tests are graded on a grading scale from 10–100.

Students have passed if they obtain a grade of 55 points or more.

If the grade is less than 10 points, it will be recorded as a grade of 10.

#### **123. Grading in letters**

A. Grading a test with either 'Pass' or 'Fail'

For reasons relating to programme content, a test may be given a grade of either 'Pass' or 'Fail'.

B. Grading a test with Advanced performance/Expected performance/Below expected performance.

For reasons relating to programme content, a test may be given a grade of above average, average or below average.

#### **124. Submitting a blank test paper**

If students submit a blank test paper, they will receive a grade of 10, or an F (Fail) in the case of a unit of study or module in which no grades are awarded.

### 125. Failure to participate in a test opportunity

If students do not participate in a test opportunity that applies to them, no result will be recorded in the academic monitoring system; however, they are considered to have used the test opportunity.

The same applies if students fail to register or cancel their registration.

Deregistering for a test by students is appreciated because it is helpful for organisational reasons to know who will be participating. But if a student doesn't register, this will have no effect on the number of test opportunities remaining to them.

### 126. Converting grades obtained at other universities

If a grade from another university is expressed using a different scale from the one applied by Inholland, the grade will be converted to one based on the scale from 10–100. The Examination Board will make rules for this procedure and appoint an examiner to convert the grade.

If the grade is obtained at an international university, a Pass (V) or Fail (O) will be listed instead of a grade. When a student is eligible for a designation as described in article [181. 'With merit'](#) or [182. 'Cum laude'](#) or when they need a certain average grade for further education, the student can request the Examination Board to convert the result from the international university into a grade.

The Examination Board will make a decision within fifteen working days.

### 127. Grade for a unit of study

The grade for a unit of study is the weighted average of the grades for the modules and tests in the unit of study, based on the ratio of the weights of the modules and tests as defined in Schedule 1 of this TER.

The main rule when awarding a grade for a unit of study is that students must pass all interim tests (obtaining 55 points or more) in order to be deemed to have passed the unit of study. This means that it is not possible to compensate for failed tests within a unit of study.

Units of study for which Schedule 1 of this TER states that compensation is possible are an exception to this rule. In that case, the rules that apply to compensation will be indicated for the unit of study. The final grade for a unit of study must, unrounded, always be at least 55 points.

### 128. Final assessment

Students must pass every unit of study.

The grade for each unit of study (see Article [127. Grade for a unit of study](#)) is converted into a final grade on a grading scale from 1–10. This final grade is stated in the list of grades attached to the degree certificate. Final grades will be rounded off to the nearest whole number, as is customary in the Netherlands.

For a limited number of units of study, the final grade may be expressed as either a 'Pass' or a 'Fail'. That will be the case if it is impossible to express the grade as a grade, as this is fitting for the study programme.

However, only a very limited number of units of study can have a final grade of 'Pass' or 'Fail'. If students have too many units of study with exemptions or 'Pass' grades, they will be unable to achieve a 'with merit' or 'cum laude' designation. For more information about "with merit" and "cum laude" designations, see Articles [181. 'With merit'](#) and [182. 'Cum laude'](#).

## Chapter 12. Test results

### 129. Timeframe for issuing results for oral tests and practical assignments

The examiner determines the test results of oral tests and practical assignments after they have been completed. If possible, the examiner will let students know the approximate result immediately after the test.

Students receive their final results no later than ten working days after the test via the PeopleSoft academic monitoring system.

### 130. Timeframe for issuing results for written tests

Students receive their final results via the Peoplesoft academic monitoring system no later than fifteen working days after the test date or the final submission deadline of the test.

### 131. Timeframe for issuing results for special written tests

For some types of written tests, students receive their final results via the PeopleSoft academic monitoring system no later than twenty working days after the test date or final submission deadline of the test. These types of tests include research reports, work placement reports and theses. If these timeframes apply, this will be indicated under the details of the type of test in the unit of study description in the attachment "Description units of study".

### 132. Alternative timeframes

The Examination Board can change the grading timeframes set out in Articles 129, 130 and 131. If they do so, they must state their reasons. The Examination Board will ensure that timeframes in respect of tests that are important for binding study recommendations are such that the recommendations can be issued on time. If timeframes are extended, students will be notified immediately.

### 133. Notification of results

Students will receive a message that their results have been recorded in the PeopleSoft academic monitoring system. They can make a copy of their results as evidence.

The message will advise students of their right to access their test work. See also Article [149. Right of access](#) The message will also tell students that they may appeal to the Examination Appeals Board via the digital [Complaints and Disputes](#) portal on Iris.

### 134. Reviewing results

If it becomes apparent, after a report from a student or during follow-up discussion of the test, that a grade is incorrect, the examiner can change the result. The provisions that applied when the examiner determined the first result also apply here.

### 135. Correction of grades

If the result in the academic monitoring system is not the same as the result previously communicated by the examiner, the student concerned can ask the examiner to change the result. The student must do so within four weeks of the date on which the result was entered in the academic monitoring system. He must submit documents to substantiate the request.

The student may appeal the examiner's decision not to change the result. The appeal should be submitted within six weeks to the Examination Appeals Board via the digital [Complaints and Disputes](#) portal on Iris.

### 136. Submission and retention of work, misplaced work

For every test, the examiner or an invigilator will establish that students are present and have submitted work by recording the fact on the attendance list.

Students should ensure that they keep a digital or physical copy of all submitted work outside a test session.

If the examiner is unable to determine a result because the work has been misplaced, the examiner will notify the Examination Board.

The student will have to take the test again. If necessary, the Examination Board can allow the student an additional test opportunity to do so.

The Examination Board will make a decision within thirty working days.

## Chapter 13. Irregularities, fraud and plagiarism

### 137. Rules relating to tests

The rules that apply to the completion of test sessions can be found:

- in the instructions for test sessions; and
- attachment "Description units of study".

The Examination Board may set additional rules. If so, these rules will be published within the first two weeks after the start of the term. They will also appear on the test cover sheet.

The instructions deal with written test sessions but apply by analogy to other forms of tests.

In all tests, students must comply with these rules and with the instructions given by the invigilator, the examiner or the Examination Board.

### 138. Irregularities

If something happens during the test process that is not in compliance with the rules as set out in the TER, the regulations or the instructions for test sessions, this is referred to as an irregularity. An irregularity *may* also be fraud or plagiarism, but this is not always the case.

Irregularities may result in a warning being issued. If there is another irregularity after the warning has been issued, it may be decided to declare the test invalid.

As a result of irregularities, it may be determined that the test is invalid for one student, for all students who took part, or for a group of students who took part, even if they were not to blame for the irregularity. This decision will be made if it is no longer possible to conduct an accurate assessment of knowledge, understanding, skills or professional attitude. See also Articles [144. Grounds for a declaration of invalidity](#) and [145. Consequences of a declaration of invalidity](#).

### 139. Disturbance

If a student causes a disturbance during a test to the extent that it affects other students sitting the test, the invigilator may ask the student to leave the testing room. The invigilator will make a note in the protocol. The Examination Board will decide as soon as possible whether the invigilator did the right thing in asking the student to leave. In doing so, it will follow the procedure set out in Article 142.

If the student refuses to leave the testing room, the invigilator may decide to allow the student to remain to prevent additional commotion that could affect the other students. In this situation, the invigilator will not give the student's work to the examiner but will instead give it to the Examination Board. The invigilator will make a note of the event in the protocol.

The Examination Board will make a decision in the same manner as if the student had actually left the room. If the Examination Board decides that the request to the student to leave was not justified, the examiner will grade the student's work.

If the Examination Board decides that the student's removal was justified, this is considered to be the same as if the student had submitted a blank test paper. The student will be given a grade of 10 (on the grading scale from 10–100) or F (Fail).

If the Examination Board decides that the student's removal was not justified, the student may sit the test again. The Examination Board will decide when and how that will happen.

### 140. Fraud/serious fraud

1. Fraud is an act or omission by a student that makes it wholly or partially impossible to conduct an accurate assessment of their knowledge, understanding, skills or professional attitude. Examples of fraud include, but are not limited to, events when a student:

- a. uses materials during the test that they are not permitted to use;
- b. cheats during a test;
- c. gives information about a test to other people or receives such information, either inside or outside the testing room;
- d. makes up and/or falsifies survey or interview answers or research data;
- e. uses or reproduces another person's texts, reasoning, data or ideas without fully and correctly referencing the source (plagiarism).

2. Serious fraud includes, but is not limited to, events when a student:



- f. falsifies tests, for example by making changes to work after being granted an opportunity to view it;
- g. doing the test (or allowing it to be done) wholly or partially by or for another;
- h. falsifying and/or forging a signature;
- i. if the abovementioned under 1.d. and 1.e. occurs in a section of the graduation programme.

Repeated fraud may be designated as serious fraud.

#### 141. Participating in fraud

Participating in fraud is also deemed to constitute fraud. Participating in fraud includes, but is not limited to:

- allowing students to cheat;
- giving information to or receiving information from another person during a test;
- giving someone the questions, tasks or model answers before or during a test;
- sitting a test or completing all or part of an assignment in another person's name.

This list of participating in fraud is not exhaustive.

#### 142. Procedure in the event of irregularities and suspected fraud

##### Report to the Examination Board

If an invigilator or examiner notices irregularities or suspects fraud before, during or after a test – while grading, for example – they will note it in the protocol that is drawn up for each test.

##### Student rights and obligations

Students may be asked to submit all the documents, data or items that may have played a role in the – suspected - fraud. If a student refuses to do so, this will be noted in the protocol.

Students may have their comments regarding the event recorded in the protocol. In that event, they may sign the protocol, but they are not required to do so.

The invigilator or examiner will give the Examination Board:

- the protocol;
- supporting documents, if any; and
- the work completed by the student, if necessary.

##### Postponement of grading

If irregularities or suspected fraud are uncovered before the work is graded, the work of the student involved will not be graded until the Examination Board has made a decision.

##### Meeting

Before the Examination Board makes a decision, the student may tell their side of the story. A report of this meeting will be drawn up. Before the Executive Board makes a decision on a proposal to deregister the student, the student may tell their side of the story. A report of this meeting will be drawn up.

##### 1. Decision-making

The Examination Board will make a decision within 30 working days about whether fraud has occurred, based on:

- the written documents; and
- what the student said during the meeting.

If fraud is found to have occurred, the Examination Board will determine whether it was serious fraud.

The Examination Board will then decide on the measures to be taken. The possible measures are set out in Article 143.

### 143. Measures in the event of fraud

#### Measures in the event of fraud

If fraud has occurred, the Examination Board will take measures that are appropriate to the fraud.

These measures are exclusively the following:

- The Examination Board confirms the measures taken by the examiner or invigilator.
- The student receives a written warning.
- The Examination Board declares the student's test invalid. In that case, the work will not be graded. If the work has already been graded, no grade will be entered in the PeopleSoft academic monitoring system. If there is already a grade in the system, it will be removed. In both cases, the letters ME (Measures of the Examination Board) will be entered.
- The Examination Board decides that the student may not take part in the next opportunity for the same test.
- The Examination Board decides that the student may not take part in any tests for a period determined by the Examination Board. That period will not exceed one year.

#### Measures in the event of serious fraud

In the event of serious or repeated fraud, the Examination Board may recommend to the Executive Board that the student's enrolment in the programme be terminated. The Examination Board will consult the faculty director first.

## Chapter 14. Declaring results to be invalid

### 144. Grounds for a declaration of invalidity

The Examination Board may determine that a result is invalid if, after the result was announced, it was found that any of the following had occurred:

- an irregularity that made an accurate assessment impossible, even if the student(s) were not to blame for the irregularity;
- fraud;
- a ruling by an appeal body.

The Examination Board will make a decision within 30 working days after becoming aware of any of the above circumstances.

### 145. Consequences of a declaration of invalidity

If a result is declared to be invalid, the grade recorded for the student(s) concerned will be replaced with ME (Measure Examination Board). The Examination Board will inform the student(s) of its decision in writing, also informing them of their right of appeal.

If the work is to be re-graded and a new result determined, the Examination Board will instruct an examiner to do so. The new result will be recorded in place of the result that was removed.

## Chapter 15. Validity period of completed tests and obtained exemptions

### 146. Limited validity period for tests and exemptions

A test result has a limited validity period if the following two conditions both apply:

- The test result has an expiry date, which is indicated in Article [23. Expiry date, transition period and validity period](#) of this TER;
- and the knowledge, understanding or skills being assessed are demonstrably obsolete.

There are no education and test results with an expiry date for the programme.

### 147. End of validity period

The validity period for an obsolete test result with an expiry date will end:

- for the foundation phase: three years after the first enrolment;
- for an accelerated programme: two years and eight months after the first enrolment;
- for the main phase of the Bachelor's programme: five years after the first enrolment for the main phase. If the student has an exemption for the foundation phase: five years after the first enrolment.

### 148. End of validity period

#### a. Extension and special circumstances

The Examination Board may extend the validity period for students:

- with special circumstances, as described in the Profile Fund (see Chapter 3 of this Education Guide);
- and for whom the validity period in Article 147 is too short.

They do not have to comply with the other conditions in Article [85. Definition of personal circumstances](#).

The Examination Board will ask the student counsellor for advice about:

- whether the special circumstances fall within the scheme; and
- how much of a delay the special circumstances have caused to the student's studies.

#### b. Extension in other circumstances

If there are any special circumstances other than those referred to above under a), and in the opinion of the Examination Board they have caused a delay in a student's studies that is not adequately compensated for by the validity period for the tests, the Examination Board may extend the validity period. The student in question must submit a request to that effect to the Examination Board.

The student may submit a new request if new special circumstances arise or the circumstances continue.

For the reporting of a study completion delay due to special circumstances and the resulting further activities, the procedure in Article [87. Procedure for establishing special and personal circumstances](#) applies. This is not the case if that procedure already applies based on other rules in the Education Guide.

Students must submit the extension request:

- electronically;
- stating reasons why they are asking for an extension;
- and before the validity period expires.

Where a student submits a request late but has a good reason for doing so, the Examination Board will still accept the request for handling.

The Examination Board will make its decision within 30 working days after the complete request is submitted.

## Chapter 16. Accessing, discussing and requesting copies of tests

### 149. Right of access

Students are entitled to view and discuss their graded work. They can do so at the latest up to four weeks after notification of the result of a written test via the PeopleSoft academic monitoring system.

Programmes determine when and where students can view and discuss their work. This may also take place digitally. When they view their work, students can also see the test standards that were used.

The Examination Board may instruct students how to view their work, for example to prevent students from disseminating test material.

**150. Right to obtain a copy in the event of a dispute**

If a student and an examiner disagree on a result, a copy of the work (or relevant part thereof) which they disagree on will be created, free of charge. The student needs this copy in order to lodge an appeal. The student must request the copy personally.

## Chapter 17. Retention of tests

**151. Original retained by the university**

The university will always keep the original of important written documents, such as important essays, work placement reports, research reports, theses and components of graduation programmes.

**152. Retention period**

The university will retain these documents, as well as final research projects, examinations and assignments that students have produced in this respect for a minimum of seven years. They may be kept in electronic or hard copy format. The university will retain these documents for longer if that is stated in the university's regulations governing retention periods.

The university will retain other student work and recordings of oral tests which are not covered by the above list of documents for two years. This is in accordance with the university's regulations governing retention periods.

**153. Inclusion in university records to comply with statutory obligations**

A copy of the documents referred to in Articles 151 and 152 will be kept in a file or archive to be used for the work of the university. This will be done only if the documents are deemed to be suitable for this purpose. The documents are necessary in order to comply with statutory obligations, such as a visit/accreditation. They may be consulted if that is in line with the university's objectives.

The same applies to inclusion in the HBO Knowledge Base: [www.hbo-kennisbank.nl](http://www.hbo-kennisbank.nl).

If the documents contain confidential information or if third parties have rights to the work, this will be respected. However, a work as a whole cannot be regarded as confidential.

**154. Keeping and retaining a (digital) portfolio**

The programme does not work with a (digital) portfolio.

## Chapter 18. Exemptions

**155. Exemptions from tests**

The Examination Board may decide that a student does not have to complete any tests for a particular unit of study or a module. This is called an 'exemption'.

**156. Unit of study exemptions**

Students will be given an exemption for a unit of study if they have been granted exemptions for all tests in that unit of study.

**157. Exemptions after switching programmes within the university**

If students switch to another programme within the university, they can take their test results and exemptions with them only if they have applied for exemptions in this respect. The same applies to any results students have previously obtained in study programmes at the university that are not government-funded.

**158. Exemption criteria**

Students may be granted exemptions if they:

- have previously passed tests and examinations within the higher education system;

- have demonstrably acquired knowledge and skills outside of the higher education system which are approximately the same as the unit of study/module and associated test(s) in terms of:
  - content;
  - level;
  - required final qualifications.

If a student requests an exemption based on tests completed in a foreign institution, the Examination Board will consider the quality of the institution in its decision. The evaluation of quality will be based on a previous investigation by the university or on the Examination Board's own investigation.

### 159. Exemptions granted solely based on up-to-date knowledge and experience

The Examination Board will grant exemptions only based on up-to-date knowledge and experience.

Generally, the Examination Board applies a period of five years when considering what 'up to date' is. In other words, the tests or examinations must have been completed no more than five years before the date of the exemption application. The same applies to knowledge and skills acquired outside of the higher education system.

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### 160. Exemptions procedure and evidence

Requests for exemptions must be submitted to the Examination Board in writing (or by email). Students must explain the reasons why they are asking for an exemption and enclose supporting documents.

The Examination Board may ask a student to provide further information or additional documents. It may also request any information it deems to be necessary in order to make a decision.

Supporting documents may include:

- copies of certificates bearing the stamp of the relevant organisation;
- transcripts showing tests and examinations, or certificates; the student must provide a full description of study or degree programmes or relevant components thereof. The same applies to results previously achieved as a contract student in the same programme at the university;
- copies of theses, articles, reports or coursework that:
  - have been written by the student; and
  - have been assessed and certified by an authorised body;
- a stamped copy of an APL report issued in accordance with the APL Quality Code by an accredited APL provider. The report must clearly show that the student has the knowledge and skills required for the requested exemption; the student must also provide the associated documents if the Examination Board asks for them.

The Examination Board will make a decision on a complete exemption application within 30 working days. The Examination Board may extend this timeframe once, by a maximum of 30 working days.

### 161. Further investigation

If the Examination Board determines, on the basis of an investigation, that a student cannot be granted an exemption for all tests in a unit of study, the Examination Board may decide to grant an exemption following a further investigation. This investigation involves a comparison by the Examination Board of the final qualifications that the student is lacking against the content of the unit of study.

The investigation may entail that the student must pass an ordinary test.

In its decision, the Examination Board will set a deadline by which the further investigation must be successfully completed.

If a student sits tests which are covered by the exemption, it will be assumed that they did so in the context of this investigation. If the student fails the test, they will not be granted an exemption for all the tests.

The Examination Board may determine that the validity of a result will end earlier than the date resulting from the general exemptions policy (see Articles [146. Limited validity period for tests and exemptions](#) t/m 148). The Examination Board may do so

when:

- the student's request relates to an exemption they previously received for another programme at the university;
- or the programme is being updated.

#### 162. Waiving further investigation

If the Examination Board decides that a component of a test is not essential in terms of the conditions as specified in the unit of study description regarding the acquisition of the knowledge, understanding and skills required to obtain the degree, it may decide not to conduct an investigation into that component. This may only occur in an exceptional case, such as disability or religious belief. It also depends on the reasons given by the student.

#### 163. Exemptions prior to enrolment

The Examination Board may also decide to grant an exemption before a student is enrolled. In that case, the student will receive the exemption only once they have actually enrolled.

#### 164. Exemption from foundation examination

If a student has obtained an exemption for all foundation phase tests, he is deemed to be exempt from the foundation examination, unless the Examination Board has conducted its own investigation as described in Article [173. Examination Board investigation](#).

In that case, the student will not receive a foundation certificate.

#### 165. No exemption from final examination

Students can only obtain a limited number of exemptions for the final examination of a Bachelor's programme.

For this final examination, students must obtain a minimum of 60 credits by successfully completing tests. This includes units of study connected with a graduation programme or part thereof. In the case of an accelerated pre-university education pathway, this will be a minimum of 45 credits. This includes units of study connected with a graduation programme or part thereof.

#### 166. Recording exemptions

If an exemption is granted for a test, the word 'vrijstelling' (exemption), or the abbreviation 'VR', will be recorded in place of the test result in the PeopleSoft academic monitoring system. This will be based on the date on which the student is notified of the decision. If this date is prior to the date of enrolment, the date of enrolment will be used.

## Chapter 19. Unit of study substitution; national and international mobility

#### 167. Request for substitution

Students may request the Examination Board to let them substitute one or more of the units of study which they still need to complete, along with the associated tests, with units of study and associated tests from another programme offered by the university or by another Dutch or foreign institution of higher education. Students must explain the reasons for their request. This is subject to the condition that students still meet the requirements of the examination, and that the study load in credits must remain the same.

The Examination Board will make its decision within 30 working days after the complete request is submitted.

#### 168. No request required

Students do not need to submit a request if there is a partnership agreement between the university and another institution in the Netherlands or abroad.

#### 169. Rules for teaching and testing in the case of a substitution

Any classes taken and tests completed at other institutions will be subject to the rules for teaching and testing of that institution. This does not apply if the Examination Board decides otherwise in this respect.

**170. Other conditions**

The Examination Board may impose other conditions on the substitution of units of study and the associated tests. The substitution of units of study and associated tests with those of a foreign institution is subject to the condition that the quality of the foreign institution can be established by the Examination Board, based on:

- a previous investigation by the university;
- or the Examination Board's own investigation.

The Examination Board may also seek advice from Nuffic (the Dutch organisation for internationalisation in education).

# 9 PART 9. EXAMINATIONS, DEGREE CERTIFICATES AND TRANSCRIPTS

## Chapter 1. Examinations

### 171. Foundation and final examination

The programme includes both a foundation examination and a final examination.

### 172. Requirements for passing the examination

Students have passed the foundation examination if:

- they have passed the tests for all units of study that are part of the foundation phase of the programme;
- and the validity period of those tests has not expired.

This does not apply if the Examination Board decides to conduct its own investigation, as described in Article 173.

Students have passed the final examination if:

- they have passed the tests for all units of study that are part of the main phase of the programme;
- and the validity period of those tests has not expired.

This does not apply if the Examination Board decides to conduct its own investigation, as described in Article 173.

### 173. Examination Board investigation

The Examination Board may decide that the examination, in addition to the tests in the programme, will include an investigation conducted by the Examination Board itself into students' knowledge, understanding and research.

This investigation is more or less the same as a test.

The Examination Board of the programme does not conduct its own investigation.

### 174. Requirements for passing the examination

In exceptional cases, the Examination Board may decide that students do not have to pass every part of a test in order to be deemed to have passed the examination. The Examination Board may set conditions for such a decision. Examples of exceptional cases are a disability or religious belief.

The Examination Board may make such a decision if it considers that a component of a test is not essential in terms of the requirements specified in the unit of study description for acquiring the knowledge, understanding and skills required to obtain the degree.

The Examination Board will then determine the final grade for the unit of study in a fair and reasonable manner, as much as possible in accordance with the rules set out in the TER. In doing so, the Examination Board will not give any consideration to the component in question.

## Chapter 2. Degree certificates and transcripts

### 175. Degree certificate

The Examination Board awards a degree certificate to students as proof that they have passed their final examination.



The Examination Board may decide to award the degree certificate only if the Central Student Administration declares that the student has paid all amounts due and payable by the student.

The degree certificate states the date on which the student is deemed to have passed the final examination. This is the date on which the student completed his/her last test. If the Examination Board has conducted its own investigation as described in Article 173, then the date on the certificate will be the date of the investigation.

The certificate will also state the name of the degree that has been awarded by the Executive Board.

The Examination Board awards degree certificates within five to eight weeks after students pass the final examination. The student will receive a notification with a request to check the data that will be displayed on the degree certificate. The Examination Board will then invite the student for the ceremony in which the certificate is awarded. If an Examination Board does not take the initiative to award a student's degree certificate, the student must request the Examination Board to award the certificate.

#### **176. List of grades and diploma supplement**

The Examination Board provides a list of grades with the degree certificate and also encloses a diploma supplement, except in the case of the foundation certificate.

#### **177. Deferral of awarding of the degree certificate**

If a student is entitled to receive a degree certificate but wishes to wait because it would be more advantageous to do so, and if the advantage the student would obtain is reasonable, then the student may request a deferral from the Examination Board using the designated form. On the form, the student should explain why the deferral is important to him and how long he wants to wait.

This is usually so that the student can complete an additional unit of study and have it included in the list of grades as an extracurricular unit of study, and not for the purpose of completing a second study programme. Deferrals are generally for no longer than six months. In any event, it is a condition of a deferral that the student not interrupt their enrolment. Note: deferrals can have consequences, for example for the student travel product. This should be checked with the Education Executive Agency (DUO).

#### **178. Transcript**

If a student has passed more than one test and the Examination Board does not award a degree certificate to the student, the student will receive a transcript from the Examination Board upon his request. At a minimum, the transcript will specify:

- the units of study for which the student passed the tests;
- the number of credits for those units of study;
- when the student passed the tests.

## **Chapter 3. With merit and cum laude designations**

#### **179. Recording on the degree certificate**

The Examination Board may record a 'with merit' or 'cum laude' designation on the degree certificate for each examination for which a positive result has been achieved.

For the final examination, the Examination Board only counts the results from the main phase.

Awarding a designation is not in keeping with the programme's educational vision. For that reason, we do not issue designations and articles 180, 181 and 182 do not apply.

#### **180. Basis of calculation**

In performing the calculation, the Examination Board will use the final grades before rounding off for the units of study of the examination.

If a unit of study has several tests, this concerns the final grade before rounding off for that unit of study based on the calculation

of the average in accordance with Articles [127. Grade for a unit of study](#) and [128. Final assessment](#).

In addition, the student must not have been studying for a longer period than the study duration as scheduled by the university. This does not apply if the longer study duration is due to personal circumstances or other special circumstances. The Examination Board will determine whether this is the case.

#### 181. 'With merit'

The designation of 'with merit' will be recorded on the degree certificate if:

- a maximum of 30% of the total number of ECs with a word assessment is assessed. Word assessments are disregarded in the weighting.
- the weighted average final grade for all units of study is 7.0 or more;
- of these final grades, no grade is less than 6.5 before rounding off; and
- the student has received no more than 15 credits' worth of exemptions in the case of a 240 credits programme, or 11 credits in the case of a 180 credits programme.

In calculating the weighted average final grade, the Examination Board will not take into account the results for units of study that were awarded a 'Pass' or 'Fail' grade. A student can request the Examination Board to calculate the result from a foreign institution into a grade, so the grade can be taken into account for the weighted average final grade.

If a student has received more than 15 credits' worth of exemptions in the case of a 240 credits programme, or 11 credits in the case of a 180 credits programme, they may still obtain the 'with merit' designation if:

- the actual duration of the student's studies was correspondingly shorter due to these exemptions; and
- the number of credits for the final examination which the student achieved through tests, amounts to at least half of the total number of credits for that examination.

#### 182. 'Cum laude'

*The designation 'cum laude' is recorded as:*

- the weighted average final grade for all units of study is 8.0 or more;
- of these final grades, no grade is less than 7.0 before rounding off; and
- the student has received no more than 15 credits' worth of exemptions (in the case of an accelerated pre-university pathway, 11 credits).
- For the foundation year, the student may not have obtained more than 5 credits of exemption (max. 4 credits for a fast-track programme of 45 credits). In calculating the weighted average final grade, the Examination Board will not take into account the results for units of study that were awarded a 'Pass' or 'Fail' grade. At the student's request, the examination board may convert results obtained at a foreign institution into a grade so that this result can be taken into account.

If a student has received more than 15 credits' worth of exemptions in the case of a 240 credits programme, or 11 credits in the case of a 180 credits programme: 11 credits)? The student may still be awarded the 'cum laude' designation if:

- the actual duration of the student's studies was correspondingly shorter due to these exemptions; and
- the number of credits for the final examination which the student achieved through tests, amounts to at least half of the total number of credits for that examination.

Moreover, for the final examination the final grade before rounding off for the units of study that form part of the graduation programme must be at least 8.0. The Annual Programme of this TER sets out which unit of study will be the determining factor for the designation 'cum laude'.

## 10 PART 10. FINAL AND TRANSITIONAL PROVISIONS

### 183. Updating the TER

The TER will not be changed during the academic year, unless the interests of students will not be adversely affected by the change.

### 184. Unforeseen circumstances

In any situations not provided for by the TER, a decision will be made by:

- the Executive Board, if the situation concerns general provisions;
- the faculty director responsible for the programme, if the situation concerns programme-specific provisions.

When implementing the TER, if staff members cannot agree on who has authority in a particular situation, the Executive Board will designate the competent body.

### 185. Publication, entry into force and authentic version

This TER forms part of the Education Guide of the university as referred to in Section 7.59 of the WHW

The Executive Board may extend the period of validity of general provisions of the TER. This can only be done for an entire academic year. The representative advisory council must give consent for the extension.

The faculty director can extend the period of validity of the programme-specific information. This can only be done for an entire academic year. The representative advisory council must give consent for the extension.

In the event of a discrepancy or difference of interpretation of the provisions of the TER, the text of the Dutch version will take priority over any version in another language.

# 11 Appendix: Annual Programmes

Programme: **Informatica** Faculty: **Engineering, Design, Computing** Mode of study: **voltijd**

## Overview units of study

### Legend

AF	Graduation part
PR	Graduation part designation
KE	Qualitative requirement (BSR)
BD	Professional component
OP	Optional professional or educational component
EW	Requirements for the job
KZ	Choice whether there are requirements for the job
C	Compensation within the unit of study

### Academic year 1

Unit of study	Code	Term	ECTS	Specific details
<b>Basic curriculum</b>				
<u>Web Markup</u>	1923IN111Z	■ ■ ■ ■	4	
<u>Web Design</u>	1923IN112Z	■ ■ ■ ■	4	
<u>Programming 1</u>	1923IN113Z	■ ■ ■ ■	4	
<u>Mathematics</u>	1918IN115Z	■ ■ ■ ■	3	
<u>Management Information Systems</u>	1918IN121Z	■ ■ ■ ■	4	
<u>Professional Skills Year 1a</u>	1920IN129Z	■ ■ ■ ■	1	
<u>Linux 1</u>	1918IN123Z	■ ■ ■ ■	3	
<u>Introduction to Modeling</u>	1918IN124Z	■ ■ ■ ■	3	
<u>Programming 2</u>	1918IN126Z	■ ■ ■ ■	4	
<u>Communication 1</u>	1921IN131Z	■ ■ ■ ■	3	
<u>Databases</u>	1916IN133Z	■ ■ ■ ■	4	
<u>Programming 3</u>	1918IN133Z	■ ■ ■ ■	3	

Unit of study	Code	Term	ECTS	Specific details
<u>Project Database</u>	1921IN138Z	■ ■ ■ ■	3	
<u>Project Management 1</u>	1921IN135Z	■ ■ ■ ■	2	
<u>Networks</u>	1917IN114Z	■ ■ ■ ■	3	
<u>Interaction Design</u>	1917IN142Z	■ ■ ■ ■	3	
<u>Communication 2</u>	1918IN143Z	■ ■ ■ ■	1	
<u>Design Patterns</u>	1918IN144Z	■ ■ ■ ■	3	
<u>Project Building applications</u>	1921IN145Z	■ ■ ■ ■	4	
<u>Professional Skills Year 1b</u>	1920IN147Z	■ ■ ■ ■	1	

## Academic year 2

Unit of study	Code	Term	ECTS	Specific details
<b>Basic curriculum</b>				
<u>Java Fundamentals</u>	1917IN232Z	■ ■ ■ ■	3	
<u>IT Service Management</u>	1919IN231Z	■ ■ ■ ■	6	
<u>NoSQL</u>	1920IN233Z	■ ■ ■ ■	5	
<u>Individual Project</u>	1913IN225Z	■ ■ ■ ■	1	
<u>Project Application Design</u>	1919IN211Z	■ ■ ■ ■	4	
<u>Functional Modeling</u>	1913IN214Z	■ ■ ■ ■	2	
<u>User Interface Design</u>	1911IN212Z	■ ■ ■ ■	2	
<u>Project Management 2</u>	1917IN214Z	■ ■ ■ ■	2	
<u>Web Development 1</u>	1917IN215Z	■ ■ ■ ■	3	
<u>English</u>	1911IN215Z	■ ■ ■ ■	2	
<u>Project Web Application</u>	1918IN221Z	■ ■ ■ ■	5	
<u>Entrepreneurship &amp; ICT</u>	1921OSICTZ	■ ■ ■ ■	2	
<u>Web Development 2</u>	1920IN223Z	■ ■ ■ ■	4	
<u>Linux 2</u>	1920IN226Z	■ ■ ■ ■	3	
<u>Professional Skills Year 2a</u>	1919IN227Z	■ ■ ■ ■	1	
<u>Project Code Generation</u>	1921IN241Z	■ ■ ■ ■	6	

Unit of study	Code	Term	ECTS	Specific details
<u>Java Advanced</u>	1921IN248Z	■ ■ ■ ■	3	
<u>Social Ethical/Legal Research</u>	1922IN243Z	■ ■ ■ ■	5	
<u>Professional Skills Year 2b</u>	1919IN247Z	■ ■ ■ ■	1	

### Academic year 3

Unit of study	Code	Term	ECTS	Specific details
<b>Basic curriculum</b>				
<u>Internship</u>	1920PRSTGZ	■ ■ ■ ■	29	
<u>Professional Skills Year 3</u>	1920PROF3Z	■ ■ ■ ■	1	
<b>Elective: Big Data &amp; AI</b>				
<u>Project Big Data &amp; AI: Design</u>	1922PBDAIZ	■ ■ ■ ■	5	
<u>Big Data &amp; AI Fundamentals</u>	1922BDAIFZ	■ ■ ■ ■	2	
<u>Computer Vision 1</u>	1922CVIS1Z	■ ■ ■ ■	2	
<u>Data Mining &amp; Statistics</u>	1922DMSTAZ	■ ■ ■ ■	3	
<u>Python &amp; Tools</u>	1922PYHTTZ	■ ■ ■ ■	1	
<u>Research Big Data</u>	1922RESBDZ	■ ■ ■ ■	2	
<u>Project Big Data &amp; AI: PoC</u>	1922BDPOCZ	■ ■ ■ ■	6	
<u>Parallel Distributed Processing</u>	1922PARDPZ	■ ■ ■ ■	3	
<u>Computer Vision 2</u>	1922CVIS2Z	■ ■ ■ ■	2	
<u>Natural Language Processing</u>	1922NLNGPZ	■ ■ ■ ■	2	
<u>Capita Selecta</u>	1922CAPSLZ	■ ■ ■ ■	1	
<u>Professioneel presenteren</u>	1922BDAPPZ	■ ■ ■ ■	1	
<b>Elective: Security</b>				
<u>Professional Presenting</u>	1922SEC01Z	■ ■ ■ ■	1	
<u>Penetration Testing</u>	1923SEC02Z	■ ■ ■ ■	4	
<u>Network Security</u>	1920SEC03Z	■ ■ ■ ■	3	
<u>Information Security</u>	1916SEC04Z	■ ■ ■ ■	1	
<u>Secure Programming</u>	1918SEC05Z	■ ■ ■ ■	3	

Unit of study	Code	Term	ECTS	Specific details
<u>Project Offensive Security</u>	1923SEC06Z	■ ■ ■ ■	3	
<b>Elective: User Experience</b>				
<u>Research UX</u>	1919UE005Z	■ ■ ■ ■	2	
<u>Project UX</u>	1923UE004Z	■ ■ ■ ■	6	
<u>Psychology of Interaction</u>	1918UE001Z	■ ■ ■ ■	2	
<u>UX Methodologies</u>	1919UE002Z	■ ■ ■ ■	2	
<u>Workshop UX</u>	1920UE003Z	■ ■ ■ ■	3	

#### Academic year 4

Unit of study	Code	Term	ECTS	Specific details
<b>Basic curriculum</b>				
<u>Graduation</u>	1914IN441Z	■ ■ ■ ■	29	AF PR
<u>Professional Skills Year 4</u>	1917IN442Z	■ ■ ■ ■	1	
<b>Elective: Cloud Computing</b>				
<u>Cloud Databases</u>	1920CLD01Z	■ ■ ■ ■	3	
<u>Server Side Programming</u>	1918MOBL2Z	■ ■ ■ ■	3	
<u>Research Cloud 1</u>	1922CLD03Z	■ ■ ■ ■	2	
<u>Project Cloud API</u>	1923CLD04Z	■ ■ ■ ■	10	
<u>Cloud Infrastructure</u>	1922CLD05Z	■ ■ ■ ■	5	
<u>Dev/Ops and SRE</u>	1922CLD06Z	■ ■ ■ ■	2	
<u>Microservices Architecture</u>	1922CLD07Z	■ ■ ■ ■	3	
<u>Research Cloud 2</u>	1922CLD09Z	■ ■ ■ ■	2	
<b>Elective: Mobile Development</b>				
<u>Mobile Platforms</u>	1918MOBL1Z	■ ■ ■ ■	6	
<u>Mobile User Interface Design</u>	1920MOBL3Z	■ ■ ■ ■	2	
<u>Project Application Design</u>	1920MOBL4Z	■ ■ ■ ■	5	
<u>Research Mobile 1</u>	1922MOBL8Z	■ ■ ■ ■	2	
<u>Research Mobile 2</u>	1920MOBL6Z	■ ■ ■ ■	2	

Unit of study	Code	Term	ECTS	Specific details
<u>Project Mobile Application</u>	1922MOBL7Z	■ ■ ■ ■	10	
<u>Mobile Security</u>	1922MOBL5Z	■ ■ ■ ■	3	
<b>Elective: Software Development</b>				
<u>Software Development</u>	1921SOFTDZ	■ ■ ■ ■	30	

## Overview of tests

### Legend

GRD	Grade assessment scale with the minimum score in parenthesis
SUS	Pass / fail scale
NIV	3-point level scale (exceeds the standard / meets the standard / does not yet meet the standard)
0%-100%	Weighting factor
SBU	Number of study hours
S/M/AW	Examination format (Written, Oral, Other method)
TZ	Examination session
AP	Compulsory attendance
LN	Longer timeframe for issuing results

### Academic year 1

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
<b>Basic curriculum</b>							
Web Markup	Web Markup	1918IN111A	GRD(55)	100%	112	AW	
Web Design	Web Design	1918IN112A	GRD(55)	100%	112	AW	
Programming 1	Programming 1	1918IN113A	GRD(55)	100%	112	S	TZ
	Assignments Programming 1	1918IN113B	SUS	0%	0	AW	
Mathematics	Mathematics	1918IN115A	GRD(55)	100%	84	S	TZ
Management Information Systems	Management Information Systems	1918IN121A	GRD(55)	100%	84	S	TZ
	Assignments Management Information Systems	1918IN121B	SUS	0%	28	AW	



Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Professional Skills Year 1a	Professional Skills Year 1a	1920IN129A	SUS	100%	28	AW	AP
Linux 1	Linux 1	1918IN123A	GRD(55)	100%	84	S	TZ
Introduction to Modeling	Introduction to Modeling	1918IN124A	GRD(55)	100%	84	S	TZ
Programming 2	Programming 2	1918IN126A	GRD(55)	100%	84	S	TZ
	Assignments Programming 2	1918IN126B	SUS	0%	28	AW	
Communication 1	Linguistic Test: English	1918IN131A	GRD(55)	33%	28	S	TZ
	Interviewing and Report Writing	1918IN131B	GRD(55)	67%	56	S	AP LN
	Dutch Language and Culture	1921IN131C	SUS	0%	0	AW	AP
Databases	Databases (SQL)	1912IC136A	GRD(55)	50%	56	S	TZ
	Datamodeling (ERD)	1912IC128A	GRD(55)	50%	56	S	TZ
Programming 3	Programming 3	1918IN133A	GRD(55)	100%	84	S	TZ
	Assignments Programming 3	1918IN133B	SUS	0%	0	AW	
Project Database	Project Database	1916IN138A	GRD(55)	100%	84	S	AP LN
	Process dossier	1921IN138B	SUS	0%	0	AW	
Project Management 1	Projectmanagement 1	1918IN135A	GRD(55)	100%	28	S	TZ
Networks	Networks (CCNA 1)	1912IC114A	GRD(55)	100%	84	S	TZ
	Networks practical	1917IN114B	SUS	0%	0	AW	
Interaction Design	Interaction Design	1913IC142A	GRD(55)	50%	42	S	TZ AP
	Design document	1917IN142B	GRD(55)	50%	42	S	LN
Communication 2	Presentation	1918IN143A	GRD(55)	100%	28	AW	AP
Design Patterns	Design Patterns	1918IN144A	GRD(55)	100%	84	S	TZ
	Assignments Design Patterns	1918IN144B	SUS	0%	0	AW	
Project Building applications	Building applications	1918IN145A	GRD(55)	80%	84	AW	AP
	Project documentation	1918IN145B	GRD(55)	20%	14	S	AP LN
	Process dossier	1919IN145C	SUS	0%	14	S	AP LN

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Professional Skills Year 1b	Professional Skills Year 1b	1920IN147A	SUS	100%	28	AW	AP

## Academic year 2

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Basic curriculum							
Java Fundamentals	Java Fundamentals	1917IN232A	GRD(55)	100%	84	S	TZ
IT Service Management	IT Service management theory	1918IN231A	GRD(55)	50%	84	S	TZ
	Project IT Service Management	1918IN231B	GRD(55)	50%	84	S	AP LN
	Process dossier	1919IN231C	SUS	0%	0	AW	AP
NoSQL	NoSQL Project	1918IN233A	GRD(55)	60%	84	AW	AP
	NoSQL Theory	1918IN233B	GRD(55)	40%	56	S	TZ
Individual Project	Individual Project	1913IN225A	GRD(55)	100%	28	AW	
Project Application Design	Application Design	1915IN211A	GRD(55)	100%	84	AW	AP
	Functional Documentation	1919IN211B	SUS	0%	28	S	AP LN
	Process dossier	1918IN211C	SUS	0%	0	S	AP LN
Functional Modeling	Functional Modeling (UML)	1913IN214A	GRD(55)	100%	56	S	TZ
User Interface Design	User Interface Design	1911IN212A	GRD(55)	100%	56	S	TZ
Project Management 2	Project Management 2	1917IN214A	GRD(55)	100%	56	S	TZ
Web Development 1	Web Development 1	1917IN215A	GRD(55)	100%	84	AW	
English	English	1911IN215A	GRD(55)	100%	56	AW	
Project Web Application	Application	1917IN221A	GRD(55)	80%	112	AW	AP
	Technical documentation	1918IN221B	GRD(55)	20%	28	S	AP LN
	Process dossier	1918IN221C	SUS	0%	0	S	AP LN
Entrepreneurship & ICT	Business Plan	1921OSICTA	SUS	0%	28	S	LN
	Business Pitch	1921OSICTB	GRD(55)	100%	28	AW	
Web Development 2	Web Development 2	1917IN223A	GRD(55)	100%	112	AW	

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Linux 2	Linux 2	1918IN226A	GRD(55)	50%	56	S	TZ
	Linux 2 Practical	1920IN226B	GRD(55)	50%	28	AW	
Professional Skills Year 2a	Professional Skills Year 2a	1919IN227A	SUS	100%	28	AW	AP
Project Code Generation	Code Review	1918IN241A	GRD(55)	10%	17	AW	AP
	API design	1918IN241B	GRD(55)	25%	42	AW	AP
	API testing	1918IN241C	GRD(55)	25%	42	AW	AP
	Code assessment	1918IN241D	GRD(55)	40%	67	AW	AP
	Process dossier	1919IN241E	SUS	0%	0	S	AP LN
Java Advanced	Java Advanced	1915IN248A	GRD(55)	100%	84	S	TZ
Social Ethical/Legal Research	Social Ethical research	1922IN243A	GRD(55)	50%	70	S	LN
	Legal research	1922IN243B	GRD(55)	50%	70	S	LN
Professional Skills Year 2b	Professional Skills Year 2b	1919IN247A	SUS	100%	28	AW	AP

### Academic year 3

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Basic curriculum							
Internship	Internship start document	1920PRSTGA	SUS	0%	200	S	AP LN
	Internship Report	1920PRSTGB	GRD(55)	80%	600	S	AP LN
	End Presentation Internship	1920PRSTGC	GRD(55)	20%	12	M	TZ AP
Professional Skills Year 3	Professional Skills Year 3	1920PROF3A	SUS	100%	28	AW	AP
Elective: Big Data & AI							
Project Big Data & AI: Design	Cleaned/prepared dataset	1922PBDAIA	GRD(55)	30%	42	AW	AP
	Trained Model	1922PBDAIB	GRD(55)	40%	56	AW	AP
	TFGD	1922PBDAIC	GRD(55)	30%	42	AW	AP
Big Data & AI Fundamentals	Big Data & AI Fundamentals	1922BDAIFA	GRD(55)	100%	56	S	
Computer Vision 1	Computer Vision 1	1922CVIS1A	GRD(55)	100%	56	S	TZ

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Data Mining & Statistics	Data Mining & Statistics	1922DMSTAA	GRD(55)	100%	84	S	
Python & Tools	Python & Tools	1922PYHTA	GRD(55)	100%	28	S	
Research Big Data	Research Big Data	1922RESBDA	GRD(55)	100%	56	S	
Project Big Data & AI: PoC	Proof of Concept Application	1922BDPOCA	GRD(55)	50%	84	AW	AP
	Advice Report / Publication	1922BDPOCB	GRD(55)	50%	84	S	AP
Parallel Distributed Processing	Parallel Distributed Processing	1922PARDPA	GRD(55)	100%	84	S	
Computer Vision 2	Computer Vision 2	1922CVIS2A	GRD(55)	100%	56	S	TZ
Natural Language Processing	Natural Language Processing	1922NLNGPA	GRD(55)	100%	56	S	
Capita Selecta	Capita Selecta	1922CAPSLA	GRD(55)	100%	28	S	
Professioneel presenteren	Professional Presenting	1922BDAPPA	GRD(55)	100%	28	S	AP LN
<b>Elective: Security</b>							
Professional Presenting	Professional Presenting	1922SEC01A	GRD(55)	100%	28	S	AP LN
Penetration Testing	Workshops	1923SEC02A	GRD(55)	100%	112	AW	
Network Security	Network Security	1916SEC03A	GRD(55)	100%	56	S	TZ
	Network Security Practical	1916SEC03B	SUS	0%	28	AW	
Information Security	Information Security	1916SEC04A	GRD(55)	100%	28	S	TZ
Secure Programming	Secure Programming	1918SEC05A	GRD(55)	100%	84	S	TZ
Project Offensive Security	Final Report	1923SEC06A	GRD(55)	100%	84	AW	
	Final Presentation	1923SEC06B	SUS	0%	0	AW	
<b>Elective: User Experience</b>							
Research UX	Research UX	1919UE005A	GRD(55)	100%	56	S	LN
Project UX	Alpha	1923UE004A	GRD(55)	20%	42	AW	
	Release Candidate	1923UE004B	GRD(55)	20%	42	AW	
	Beta	1923UE004C	GRD(55)	30%	42	AW	
	Gold Master	1923UE004D	GRD(55)	30%	42	AW	

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Psychology of Interaction	Psychology of Interaction	1918UE001A	GRD(55)	100%	56	S	TZ AP
UX Methodologies	UX Methodologies	1919UE002A	GRD(55)	100%	56	S	AP LN
Workshop UX	Workshop 1	1919UE003A	SUS	0%	28	AW	AP
	Workshop 2	1918UE003B	GRD(55)	100%	56	AW	AP

#### Academic year 4

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Basic curriculum							
Graduation	Graduation paper	1914IN441A	GRD(55)	70%	588	S	AP LN
	Oral Exam	1914IN441B	GRD(55)	30%	224	M	TZ AP
Professional Skills Year 4	Professional Skills Year 4	1917IN442A	SUS	100%	20	AW	AP
Elective: Cloud Computing							
Cloud Databases	Cloud Databases	1920CLD01A	GRD(55)	100%	84	AW	
Server Side Programming	Server Side Programming	1918MOBL2A	GRD(55)	100%	84	AW	
Research Cloud 1	Research Cloud 1	1922CLD03A	SUS	100%	56	S	LN
Project Cloud API	Presentation API model	1923CLD04B	GRD(55)	30%	79	M	TZ
	Code review	1919CLD04C	GRD(55)	30%	79	AW	
	Code assessment	1916CLD04D	GRD(55)	40%	108	AW	
	Presentation final product	1916CLD04E	SUS	0%	14	M	TZ
Cloud Infrastructure	Cloud Infrastructure	1922CLD05A	GRD(55)	100%	140	AW	
Dev/Ops and SRE	Dev/Ops and SRE	1922CLD06A	GRD(55)	100%	56	AW	
Microservices Architecture	Microservices Architecture	1922CLD07A	GRD(55)	100%	84	AW	
Research Cloud 2	Research Cloud 2	1922CLD09A	GRD(55)	100%	56	S	LN
Elective: Mobile Development							
Mobile Platforms	Apple	1918MOBL1A	GRD(55)	50%	84	AW	
	Android	1918MOBL1B	GRD(55)	50%	84	AW	

Unit of study	Test	Code	Scale	Weight	SBU	Mode	Specific details
Mobile User Interface Design	Mobile User Interface Design	1920MOBL3A	GRD(55)	100%	56	AW	
Project Application Design	Project Application Design	1920MOBL4A	GRD(55)	100%	140	AW	AP
Research Mobile 1	Research Mobile 1	1922MOBL8A	SUS	100%	56	S	LN
Research Mobile 2	Research Mobile 2	1920MOBL6A	GRD(55)	100%	56	S	LN
Project Mobile Application	Mobile app bêta version	1915MOBL7A	GRD(55)	40%	90	AW	AP
	Mobile App Development	1915MOBL7B	GRD(55)	60%	152	AW	AP
	Presentation Mobile App	1915MOBL7C	SUS	0%	0	M	TZ AP
Mobile Security	Paper Security	1919MOBL5A	SUS	0%	56	S	LN
	Mobile Security	1919MOBL5B	GRD(55)	100%	28	S	TZ
<b>Elective: Software Development</b>							
Software Development	Research Software Development	1921SOFTDA	GRD(55)	50%	400	AW	
	Presentation Software Development	1921SOFTDB	SUS	0%	40	AW	
	Code assessment Software Development	1921SOFTDC	GRD(55)	50%	400	AW	

# Description courses

## Networks [ 1917IN114Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 4	Networks	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Networks (CCNA 1) [ 1912IC114A ]	100%	GRD (1 t/m 100)	55	84
Networks practical [ 1917IN114B ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.
<b>Learning outcomes</b>	<p><b>Design:</b></p> <ul style="list-style-type: none"> <li>1.5 Compile specifications for a local/small infrastructure according to a standard method. (IS)</li> </ul> <p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>1.5 Organize, test and make available of a local/small infrastructure. (IS)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No

<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Networks (CCNA 1)	1912IC114A
<b>Assessment objectives/criteria</b>	<p>Students who complete Introduction to Networks will be able to perform the following functions:</p> <ul style="list-style-type: none"> <li>• Understand and describe the devices and services used to support communications in data networks and the Internet;</li> <li>• Understand and describe the role of protocol layers in data networks;</li> <li>• Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments;</li> <li>• Explain fundamental Ethernet concepts such as media, services, and operations;</li> <li>• Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Students sit for a written multiple-choice test.
<b>Permitted Aids</b>	During the exam students are allowed to use pen and paper.	
<b>Work methods and educational activities</b>	Lecture	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Networks practical	1917IN114B
<b>Assessment objectives/criteria</b>	<p>Students can:</p> <ul style="list-style-type: none"> <li>• Build a simple Ethernet network using routers and switches;</li> <li>• Use Cisco command-line interface (CLI) commands to perform basic router and switch configuration and verification;</li> <li>• Utilize common network utilities to verify small network operations and analyze data traffic.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students take a Skills Test. (Pass/Fail)
<b>Permitted Aids</b>	Students are allowed to use PowerPoint Slides and the Command List.	
<b>Work methods and educational activities</b>	A practical section, allowing students to apply what they have learned.	
<b>Contact hours for strategies and teaching activities</b>		



<b>Compulsory attendance</b> <b>(See also Article 115 TER)</b>	Nee	
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## Mathematics [ 1918IN115Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 1	Mathematics	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Mathematics [ 1918IN115A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>Subjects covered include:</p> <ul style="list-style-type: none"> <li>• Integers</li> <li>• Fractions</li> <li>• Powers and roots</li> <li>• Algebra</li> <li>• Special products</li> <li>• Fractions with letters</li> <li>• First degree equations</li> <li>• Second degree equations</li> <li>• Systems of first degree equations</li> </ul>
<b>Learning outcomes</b>	<p><u>Competency Analyse:</u></p> <ul style="list-style-type: none"> <li>• 1.9 Analyse and solve a simple mathematical problem.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Mathematics	1918IN115A
<b>Assessment objectives/criteria</b>	<p><b>Integers</b></p> <ul style="list-style-type: none"> <li>• Addition/subtraction/multiplication of integers</li> <li>• Determining quotient and remainder using long division</li> <li>• (Prime) factorization of a number</li> <li>• Determining the gcd and lcm (of two numbers)</li> </ul> <p><b>Fractions</b></p>	

	<ul style="list-style-type: none"> <li>• Simplifying fractions</li> <li>• Rewriting fractions with common denominator</li> <li>• Addition/subtraction of fractions</li> <li>• Multiplication/division of fractions</li> </ul> <p><b>Powers and roots</b></p> <ul style="list-style-type: none"> <li>• Application of calculation rules for power</li> <li>• Calculation using integer exponents</li> <li>• Converting roots of integers to the standard form</li> <li>• Converting roots of fractions to the standard form</li> </ul> <p><b>Algebra</b></p> <ul style="list-style-type: none"> <li>• Substituting of values into algebraic expressions</li> <li>• Application of priority rules</li> <li>• Simplifying algebraic expressions with exponents</li> <li>• Expanding brackets in algebraic expressions</li> <li>• Factor out integers or algebraic expressions</li> <li>• Application of the 'Banana Rule' (product of two sums of two terms)</li> </ul> <p><b>Special products</b></p> <ul style="list-style-type: none"> <li>• Decomposing expressions</li> <li>• Expanding brackets</li> </ul> <p><b>Fractions with letters</b></p> <ul style="list-style-type: none"> <li>• Splitting and writing with common denominator</li> <li>• Simplifying fractions (with letters)</li> </ul> <p><b>First degree equations</b></p> <ul style="list-style-type: none"> <li>• solving first degree equations</li> <li>• manipulating inequalities (<math>&lt;</math>, <math>\leq</math>, <math>&gt;</math>, <math>\geq</math>)</li> <li>• reducing an equation to a first degree equation</li> </ul> <p><b>Second degree equations</b></p> <ul style="list-style-type: none"> <li>• solving second degree equations</li> <li>• solving second degree equations by completing the square</li> <li>• applying the abc formula</li> </ul> <p><b>Systems of first degree equations</b></p> <ul style="list-style-type: none"> <li>• solving systems of two equations with two unknowns</li> <li>• solving systems of three equations with three unknowns</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	The module is assessed using a written exam.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<p>Lectures cover "this week's" topics using problems and practical examples. Students solve a number of problems which are then discussed with the class.</p> <p>Students are expected to complete assignments (homework).</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

# Management Information Systems [ 1918IN121Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 2	Management Information Systems	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Management Information Systems [ 1918IN121A ]	100%	GRD (1 t/m 100)	55	84
Assignments Management Information Systems [ 1918IN121B ]	0%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>Management Information Systems introduces students to a rapidly changing profession and looks at important ICT issues in 21st century business. The various types of information systems are discussed, as well as some of the topics covered are the digital integration of companies and the ways that new technologies affect modern business management. Acquisition of basic knowledge on the following topics:</p> <ul style="list-style-type: none"> <li>• Strategic value of IT for companies;</li> <li>• Types of Information Systems;</li> <li>• Components IT infrastructure;</li> <li>• IT trends;</li> <li>• Enterprise software : ERP systems;</li> <li>• CRM (customer relationship management);</li> <li>• E-commerce; digital markets, digital products;</li> <li>• Databases &amp; BI (Business Intelligence)</li> <li>• Business Process Reengineering;</li> <li>• System development steps.</li> </ul>
<b>Learning outcomes</b>	<p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>• 1.4 Analysis of a certain organisational process, organisation, data stream, data need and process control at an operational level. (OP)</li> </ul> <p><b>Advising:</b></p>

	<ul style="list-style-type: none"> <li>1.3 Provide advice on improvements for a single organisational process in the area of organisation (structure), processes and information provision, while respecting the ICT options. (OP)</li> <li>2.5 Provide advice on new ICT possibilities, including package selection and advice. (OP)</li> <li>2.6 Provide advice about the arrangement and management of an infrastructure with supported choices for (non)functional requirements, and for available technology, management models and management methods. (IS)</li> </ul> <p><b><u>Research skills:</u></b></p> <ul style="list-style-type: none"> <li>1.4 Using sources to solve a problem;</li> <li>2.1 Collect and process the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Management Information Systems	1918IN121A
<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>Indicate the ways business management is affected by automation, the internet and web technology;</li> <li>Describe the components of an information system;</li> <li>Describe various types of information systems;</li> <li>Describe simple relationships between organisation, business processes and information systems;</li> <li>Describe information systems supporting the main functional areas of an organisation;</li> <li>Explain the importance of e-commerce and e-business;</li> <li>Describe the characteristics of enterprise (ERP) systems;</li> <li>Describe the characteristics of CRM (customer relationship management) systems;</li> <li>Describe the characteristics of e-commerce, digital markets and digital products, and the main e-commerce business models;</li> <li>Describe the characteristics of BI (business intelligence);</li> <li>Describe the characteristics of Business Process Reengineering;</li> </ul>	

	<ul style="list-style-type: none"> <li>Describe the steps of the information system development process.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam with multiple-choice and open questions. During the lecture weeks students work on assignments, which are assessed. See assignments Management Information Systems.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lecture/ seminars and independent learning.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Assignments Management Information Systems	1918IN121B
<b>Assessment objectives/ criteria</b>	The student completes a series of research practice assignments and hands in a written report on the theory topics.	
<b>Details of assessments</b>	Andere wijze without test session	Individual assignments.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lectures, seminars, assignments(at home and/or in class) and independent learning.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Professional Skills Year 1a [ 1920IN129Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 2	Professional Skills Year 1a	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 1a [ 1920IN129A ]	100%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>Professional Skills helps students gain an understanding of:</p> <ul style="list-style-type: none"> <li>• Themselves, their motives for doing the programme, interests, expectations, style of working and learning, way of planning and structuring their studies and way of collaboration;</li> <li>• The programme and future job market, the competencies the programme provides training in, the different options within the programme and the possible majors;</li> <li>• Their educational and professional career and to reflect on the experiences and the choices that can be made in this respect;</li> <li>• The way of planning and structuring their studies and establishing a personal development plan (PDP) reflecting their own development and new insights concerning items 1 to 3.</li> </ul>
<b>Learning outcomes</b>	<p><u>Competency Professionalisation</u></p> <ul style="list-style-type: none"> <li>• 1.1 Self-direction</li> <li>• 1.2 Social-communicative skills</li> <li>• 1.4 Awareness of social responsibility.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	<p>All first year students join a teambuilding event. Participation in this event is mandatory and is a requirement for Professional Skills 1a or 1b. When a student is unable to participate the teambuilding event he will work at school when the event takes place on a replacing assignment. The assignment has to be finished to receive the credit for this course. For this assignment a retake will be offered.</p>

<b><u>Module with test</u></b>	Professional Skills Year 1a	1920IN129A
<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Describe their own learning needs and learning style and based on that formulate SMART objectives in a personal development plan (PDP);</li> <li>• Express what actions they are taking in order to enhance their knowledge and skills in the areas of the programme and their future profession;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Explain the tasks and responsibilities accompanying the various aspects of the programme and on the basis of this, establish and execute a suitable schedule;</li> <li>• Explain their reasons for choosing this programme and profession to others;</li> <li>• Reflect on their own (personal and study) experiences), their own way of working during their studies and their achieved results.</li> </ul> <p>Execution:</p> <p>Written and oral (assignments and discussions): students will be working on a professional skills portfolio in which the assignments and deliverables they will work on will be collected. this portfolio consists of two parts: the first part will be handed in at the end of term 1.2; the second part at the end of term 1.4.</p>	
<b>Details of assessments</b>	Andere wijze without test session	<ul style="list-style-type: none"> <li>• Attendance at lectures (at least 80%) S/U</li> <li>• Assessment discussion (grade)</li> <li>• Written reports S/U</li> </ul> <p>Students only receive their grade after completing both lecture attendance and written reports with an S.</p>
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	<p>Three lectures per term, assignments and an individual talk.</p> <p><u>Material:</u></p> <ul style="list-style-type: none"> <li>• Syllabus Professional Skills year 1.</li> <li>• Roel Grit e.a.: Managing your competences.</li> </ul>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>The professional skills classes are interactive by nature. During the classes personal experiences and assignments are discussed and shared, including providing mutual feedback and shared reflection. Because the classes revolve around the group process, all students are required to attend at least 80% of the classes. If a student has not met the compulsory attendance requirement, the course has to be repeated.</p> <p>Individual coaching meeting: students must attend the individual coaching at the end of the second and fourth term.</p>

		If a student does not attend, a No Show assessment will be issued (1st attempt). The discussion may be repeated in the following term (2d attempt)
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## Linux 1 [ 1918IN123Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 2	Linux 1	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Linux 1 [ 1918IN123A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>The student is able to define the concept of opensource and the role Linux plays in this aspect.</p> <p>Student has to familiarize themselves with the Linux mostly through the command prompt and should understand and grasp commonly used commands. Various aspects of server, user administration and application management are reviewed.</p>
<b>Learning outcomes</b>	<p><b>Design</b></p> <p>1.5 Compile specifications for a local/small infrastructure according to a standard method. (IS)</p> <p><b>Realisation</b></p> <p>1.5 Organise, test and make available of a local/small infrastructure. (IS)</p>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b>Module with test</b>	Linux 1	1918IN123A
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<b>Assessment objectives/criteria</b>	Theoretical exam covering: <ul style="list-style-type: none"> <li>• Introduction to Linux;</li> <li>• Operating Systems;</li> <li>• Working in Linux;</li> <li>• Open Source Software and Licences;</li> <li>• Command Line Skills;</li> <li>• Getting Help;</li> <li>• Navigating the Filesystem;</li> <li>• Managing Files and Directories;</li> <li>• Archiving and Compression;</li> <li>• Working with Text;</li> <li>• Basic Scripting;</li> <li>• Understanding Computer Hardware;</li> <li>• Where Data is Stored;</li> <li>• Network Configuration;</li> <li>• System and User Security;</li> <li>• Creating Users and Groups;</li> <li>• Ownership and Permissions;</li> <li>• Special Directories and Files.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam (multiple choice).
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lectures and independent learning. The lectures consist of an instructional section. The assignments are completed in class and/or at home. Cisco learning material.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Introduction to Modeling [ 1918IN124Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 2	Introduction to Modeling	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Introduction to Modeling [ 1918IN124A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	Analysis, modelling and recording of business processes and business data using commonly
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	used UML diagram techniques
<b>Learning outcomes</b>	<u>Design:</u> <ul style="list-style-type: none"> <li>1.6 Create a design for a software system, including a database with model techniques according to a standard method. (SW).</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Introduction to Modeling	1918IN124A
<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>Read and understand Use case Diagrams in order to formally communicate the requirements of a simple system;</li> <li>Read and understand Activity Diagrams in order to formally communicate the flow of behaviour of a system;</li> <li>Read and understand Class Diagrams in order to formally communicate the structure of a system;</li> <li>Understand and have an overview of the background of structured and of object-oriented programming;</li> <li>Read and understand Sequence Diagrams in order to formally communicate the sequentiality of object communication;</li> <li>Read and understand State Diagrams in order to formally communicate the possible states of objects.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written multiple-choice (closed-book) exam.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<p>Lecture/seminar</p> <p>After an introduction, students work on exercises relevant to the presented topics. The lecturer discusses the topics and during the class supervises the completion of a number of exercises.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Programming 2 [ 1918IN126Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 2	Programming 2	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Programming 2 [ 1918IN126A ]	100%	GRD (1 t/m 100)	55	84
Assignments Programming 2 [ 1918IN126B ]	0%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>In this unit students learn how to perform structured coding in C# using a development environment.</p> <p>The following topics are covered:</p> <ul style="list-style-type: none"> <li>• Enumerations, structs and (basic) classes;</li> <li>• 2-dimensional arrays;</li> <li>• Strongly-typed lists and dictionaries;</li> <li>• File I/O;</li> <li>• Error handling and exceptions;</li> <li>• Top/down vs bottom/up implementation of a program;</li> <li>• SoC-principle (Separation of Concerns);</li> <li>• SRP (Single Responsibility Principle).</li> </ul>
<b>Learning outcomes</b>	<p><u>Competency Analyse:</u></p> <ul style="list-style-type: none"> <li>• 1.10 Analyse a simple problem and create an algorithm to solve it. (SW)</li> </ul> <p><u>Competency Realisation:</u></p> <ul style="list-style-type: none"> <li>• 1.7 Build and test make available a simple software system. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b>Module with test</b>	Programming 2	1918IN126A
<b>Assessment objectives/criteria</b>	<p>The assignments are used to assess the following skills:</p> <ul style="list-style-type: none"> <li>• apply SoC-principle and SRP-principle;</li> <li>• apply enumerations, structs and (basic) classes;</li> </ul>	

	<ul style="list-style-type: none"> <li>• using 2-dimensional arrays;</li> <li>• using strongly-typed lists and dictionaries;</li> <li>• apply File I/O;</li> <li>• apply error handling / exceptions.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	During the assessment students must individually implement a number of programs using C# in a development environment (Visual Studio).
<b>Permitted Aids</b>	IDE (Visual Studio)	
<b>Work methods and educational activities</b>	Lecture and assignments	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Assignments Programming 2	1918IN126B
<b>Assessment objectives/criteria</b>	See assessments objectives/criteria module "Programming 2".	
<b>Details of assessments</b>	Andere wijze without test session	The mandatory assignments are checked partially automatically and partially manually (by practical teacher), and feedback is given on the code. If the assignments are not approved, students get a second chance in the next term.
<b>Permitted Aids</b>	IDE ( Visual Studio).	
<b>Work methods and educational activities</b>	Students start working on the mandatory assignments during the practical classes; the assignments must be handed-in at the latest before the next practical class. The assignments must be completed individually.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Communication 1 [ 1921IN131Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 3	Communication 1	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Linguistic Test: English [ 1918IN131A ]	33%	GRD (1 t/m 100)	55	28
Interviewing and Report Writing [ 1918IN131B ]	67%	GRD (1 t/m 100)	55	56
Dutch Language and Culture [ 1921IN131C ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	<p>Communication 1 consists of two modules: <i>Interviewing and Report Writing</i>: the student learns the basics of exploratory research in preparation for the project in Term 4. This includes preparing and conducting interviews, consulting written sources, and writing a report based on the collected information. It is an individual assignment.</p> <p><i>English language test</i>: the student must demonstrate a sufficient command of the English language to follow a degree programme in English (CEFR B2+). Students who do not demonstrate this level are expected to take the language course organised by the faculty and actively work on their language skills.</p>
<b>Learning outcomes</b>	<p>The indicators below will be evaluated in a formative or summative way.</p> <p><u>Professionalisation</u>:</p> <p>6.1.1 Self-direction</p> <ul style="list-style-type: none"> <li>• Is able to operate in critical situations in an independent, results-oriented and stress-free manner.</li> <li>• Is capable of planning and organising, monitoring milestones and deadlines, and honours commitments.</li> <li>• Is able to identify, integrate and apply relevant knowledge and insights in every new situation.</li> </ul> <p>6.1.2 Social-communicative skills</p> <ul style="list-style-type: none"> <li>• Is able to communicate effectively with people in various positions/roles.</li> <li>• Is able to listen to and empathise with another person's point of view.</li> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> </ul>

	<u>Research skills:</u> <ul style="list-style-type: none"> <li>7.1.2 Formulate possible solutions to identified problems.</li> <li>7.1.4 Use sources when approaching a problem</li> <li>7.1.5 Process the provided and collected information</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Linguistic Test: English	1918IN131A
<b>Assessment objectives/criteria</b>	<p>The student:</p> <ul style="list-style-type: none"> <li>Has knowledge of the rules for spelling and punctuation and is able to apply these;</li> <li>Understands matters regarding word choice and sentence structure;</li> <li>Has adequate vocabulary.</li> </ul> <p>Students are expected to have a command of the English language in accordance with the requirements for Universities of Applied Sciences (HBO). This exam is intended to test this basic level of competency in English, and the aim of the module is to strengthen this basic level when necessary.</p>	
<b>Details of assessments</b>	Schriftelijk with test session	<p>Written exam</p> <p>Note: the exam is offered four times during the academic year, at the end of every term. Passing the exam at the end of Term 1 or Term 2 exempts the student from attending the classes organised for Term 3, and from sitting the exam of Term 3 and 4.</p>
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<p>During the course, grammar, vocabulary, reading and Use of English will be practised in the fashion of Cambridge English tests. The lessons will be interactive with plenty of opportunities for language practice and asking questions. Regular practice at home is strongly advised.</p> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>Davies, Paul, Falla, Tim (2014) <i>Cambridge English First Result: Student's Book and Online Practice Pack</i>. UK, Oxford</li> </ul>	

	University Press. • Handouts on Moodle 14 contact hours: Seminars of 90 minutes.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Interviewing and Report Writing	1918IN131B
<b>Assessment objectives/criteria</b>	<p>Two semi-structured interviews will be taken in order to obtain information regarding the project which will be carried out in Term 4. In advance a scenario will be written and at least one publication will be consulted. The scenario is subject to a go/no go-decision for the execution of the interview.</p> <p>During the classes attention is paid to: instructions for tasks to be performed, feedback on intermediate products (such as the scenario) and practical exercises, such as role plays.</p> <p>Most important learning objectives are:</p> <ul style="list-style-type: none"> <li>• Becoming acquainted with basic research skills such as interviewing and processing information from written sources;</li> <li>• Improving professional communicative skills, both verbal and written.</li> </ul> <p>The student demonstrates that he or she is capable of writing a report that meets the following requirements:</p> <ul style="list-style-type: none"> <li>• The content is obtained from two oral source (interviews) and two written sources;</li> <li>• The information (data) is collected, selected and organised in a systematic way;</li> <li>• Structure and lay-out are in accordance with conventions of a research report;</li> <li>• Language use is comprehensible, adequate and correct;</li> <li>• The APA-guidelines are applied;</li> <li>• The length is approximately 2500 words (table of content, list of references and appendixes not included).</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<p>In preparation for the interview a student creates a scenario. Scenarios are assessed with a Go/No Go. A Go needs to be obtained before conducting the interviews.</p> <p>The student submits a written report based on the interviews. This written assignment is graded.</p> <p>The result will be determined within 15 working days of the date of the examination (See also Article 131 of the TER).</p>

<b>Permitted Aids</b>	Pay attention: this part has to be rounded off before students can start with the internship.	
<b>Work methods and educational activities</b>	<p>There are six lectures/seminars, during which: Instructions are provided for the tasks the students need to perform:</p> <ul style="list-style-type: none"> <li>• Creating a scenario, conducting the interview and writing an interview report;</li> <li>• Interview techniques are practised;</li> <li>• Methods for collecting data from sources and writing reports are discussed;</li> <li>• Feedback is given on concept assignments.</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>• Summary book: <i>Readers with little time</i> by R. Elling et al. This summary can be found in the Moodle course from the term.</li> <li>• <i>Syllabus Interviewing and Report writing</i></li> <li>• Other materials to be found on Moodle.</li> </ul> <p>12 contacthours: Lectures</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Yes
<b><u>Module with test</u></b>	Dutch Language and Culture	1921IN131C
<b>Assessment objectives/criteria</b>	<p>In this course, international students will learn basic Dutch vocabulary and grammar and will acquire insights into Dutch culture. Tools are made available to students to further develop their Dutch speaking and writing skills independently.</p> <p>The course is aimed at reaching an elementary level of reading and listening skills (CEFR A1). After completing this course, students can understand non-specialist written and spoken Dutch, for instance in magazines, on television, or the Internet. Students develop their vocabulary in Dutch and study essential grammar. The various texts and sources used in the course are specifically aimed at introducing students to Dutch, and Flemish, culture and society.</p>	
<b>Details of assessments</b>	Andere wijze without test session	Students form groups and discuss the main challenge(s) for international students and expats living in the Netherlands. This discussion can be approached from a cultural or from a linguistic perspective. Students elaborate on their chosen discussion topics and write an essay (circa 1000 words) on it referring to at least two external sources to support or illustrate their stance.



		<p>In addition to the essay, there will be an obligatory vocabulary test at the end of the period. The Dutch word list will be made available at the beginning of the lesson period and will be updated and finalized by the end of the period.</p> <p>The result of the test and the assessment of the essay will be the basis of a "V" (pass) or "OV" (fail) for this course.</p>
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<p>In the various classes, students practise their reading and other language skills using texts and exercises about Dutch culture and society. Listening exercises make use of media clips about current affairs. Classes also pay attention to explaining basic grammar and offer opportunities to improve speaking skills. In preparation for class, students prepare small quizzes. Students are expected to independently improve their vocabulary, to take part in listening comprehension exercises, and to exercise grammar. Language proficiency classes are relatively intensive and require considerable preparation time and independent study. The course emphasizes reading skills, followed by elementary listening and speaking skills. These are mixed with a strong focus on Dutch culture and society.</p> <p>Materials:</p> <p><a href="http://www.learnndutch.org">www.learnndutch.org</a></p> <p><a href="http://www.dutchgrammar.com">www.dutchgrammar.com</a></p> <p><a href="https://npokennis.nl/program/13/net-in-nederland">https://npokennis.nl/program/13/net-in-nederland</a> "New to The Netherlands"</p> <p><a href="http://www.hofstede-insights.com/">www.hofstede-insights.com/</a></p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Attendance 80%

## Databases [ 1916IN133Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 3	Databases	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Databases (SQL) [ 1912IC136A ]	50%	GRD (1 t/m 100)	55	56

Datamodeling (ERD) [ 1912IC128A ]	50%	GRD (1 t/m 100)	55	56
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<b>Content of unit of study</b>	<p>This unit covers the following subjects:</p> <ul style="list-style-type: none"> <li>• Data Modelling;</li> <li>• Data Models and Database Design.</li> </ul> <p>Topics covered include:</p> <ul style="list-style-type: none"> <li>• Entities, attributes and relationships (ERDs);</li> <li>• Functionality and Totality of Relationship = A Relationship;</li> <li>• Rules of conversion to a relational database model.</li> </ul>
<b>Learning outcomes</b>	<p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>• 1.10 Analyse and solve a simple mathematical problem. (SW)</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>• 1.6 Create a design for a software system, including a database with model techniques according to a standard method. (SW)</li> </ul> <p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>• 1.6 Build, test and make available a simple software system. The set-up, filling and querying of a data base is part of the software system. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Databases (SQL)	1912IC136A
<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Apply the basic operators (negation, conjunction, disjunction, implication, equivalence) from logic theory using truth tables;</li> <li>• Apply basic operations and notation from set theory;</li> <li>• Differentiate between DDL and DML queries;</li> <li>• Retrieve information from a database using SELECT (DISTINCT), FROM, WHERE, GROUP BY, HAVING, JOIN, and/or a subselect;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Create a simple database or adjust a database using CREATE, DROP, ALTER, INSERT, DELETE statements, using the referential integrity rules, and foreign key rules.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lectures/ seminars	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Datamodeling (ERD)	1912IC128A
<b>Assessment objectives/criteria</b>	Students are able to: <ul style="list-style-type: none"> <li>• Distil data groups from a general description;</li> <li>• Define and describe relationships between data groups;</li> <li>• Specify the functionality and totality of relationships;</li> <li>• Identify specialisation/generalisation links (= is a relationship);</li> <li>• Design a basic relational database based on an ERD;</li> <li>• Normal Forms.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lectures/seminars	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Programming 3 [ 1918IN133Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 3	Programming 3	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Programming 3 [ 1918IN133A ]	100%	GRD (1 t/m 100)	55	84
Assignments Programming 3 [	0%	SUS (Voldoende / Onvoldoende)	V	0

1918IN133B ]				
<b>Content of unit of study</b>	<p>Students will learn how to program in an object-oriented language and will learn several OO-principles (Abstraction, Inheritance, Polymorphism and Encapsulation). Students will also learn how to separate an application into several layers: a userinterface layer, a logic layer and a database layer.</p>			
<b>Learning outcomes</b>	<p><u>Competency Analyse:</u></p> <ul style="list-style-type: none"> <li>• 1.10 Analyse a simple problem and create an algorithm to solve it. (SW)</li> </ul> <p><u>Competency Realisation:</u></p> <ul style="list-style-type: none"> <li>• 1.7 Build, test and make available a simple software system. (SW)</li> </ul>			
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.			
<b>Phase of Bachelor's programme</b>	propedeuse			
<b>Qualitative requirement BSR</b>	No			
<b>Graduation product designation</b>	No			
<b>Sets requirement for the work environment</b>	No			
<b>Professional part</b>	No			
<b>Specific details</b>	None.			

<b><u>Module with test</u></b>	Programming 3	1918IN133A
<b>Assessment objectives/criteria</b>	<p>Students know the following basic principles and concepts of Object Orientation and are able to correctly describe/recognise and use them in an application:</p> <ul style="list-style-type: none"> <li>• Base classes and derived classes;</li> <li>• Constructors;</li> <li>• Access modifiers;</li> <li>• Properties;</li> <li>• Virtual/override methods;</li> <li>• Abstract classes;</li> <li>• Interfaces.</li> </ul> <p>The student can correctly apply the following OO-principles:</p> <ul style="list-style-type: none"> <li>• Abstraction;</li> <li>• Inheritance;</li> <li>• Polymorphism;</li> <li>• Encapsulation.</li> </ul> <p>The student is capable of applying these principles correctly in an application from a given description.</p>	
<b>Details of assessments</b>	Schriftelijk with test session	Students must implement (individually) a number of assignment in C# with a

		development environment (Visual Studio).
<b>Permitted Aids</b>	IDE (Visual Studio).	
<b>Work methods and educational activities</b>	Lectures, practical classes and assignments	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b>Module with test</b>	Assignments Programming 3	1918IN133B
<b>Assessment objectives/criteria</b>	See test criteria module "Programmning 3".	
<b>Details of assessments</b>	Andere wijze without test session	The mandatory assignments are checked partially automatically and partially manually (by practical teacher), and feedback is given on the code. If the assignments are not approved, students get a second chance in the next term.
<b>Permitted Aids</b>	IDE ( Visual Studio).	
<b>Work methods and educational activities</b>	Students start working on the mandatory assignments during the practical classes; the assignments must be approved at the latest before the next practical class. The assignments must be completed individually.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Database [ 1921IN138Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 3	Project Database	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Project Database [ 1916IN138A ]	100%	GRD (1 t/m 100)	55	84
Process dossier [ 1921IN138B ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	Students work in groups to create an application consisting of multiple layers. Students should implement code for each layer that belongs to those responsibilities of the respective layer. In addition, students are required to create their own design for a database. This design is converted into an actual database with content that is approachable by the above application.	
<b>Learning outcomes</b>	<p><b><u>Realisation:</u></b> 1.6 Build, test and make available a simple software system. The set-up, filling and querying of a database is part of the software system. (SW)</p> <p><b><u>Design:</u></b> 1.6 Create a design for a software system, including a database with model techniques according to a standard method (SW)</p> <p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 1.1 Self-direction;</li> <li>• 1.2 Social- communicative skills;</li> <li>• 1.3 Creativity and problem solving skills ;</li> <li>• 1.4 Awareness of social responsibility.</li> </ul>	
<b>Requirements for participation in units of study (See also article 31a TER)</b>	No specific requirements	
<b>Phase of Bachelor's programme</b>	propedeuse	
<b>Qualitative requirement BSR</b>	No	
<b>Graduation product designation</b>	No	
<b>Sets requirement for the work environment</b>	No	
<b>Professional part</b>	No	
<b>Specific details</b>	None.	

<b><u>Module with test</u></b>	Project Database	1916IN138A
<b>Assessment objectives/criteria</b>	Correct implementation of database queries in code; Correct implementation of database approach; Correct coupling of software layers.	
<b>Details of assessments</b>	Schriftelijk without test session	Written (no sitting) in individual -and group- format using the delivered code
<b>Permitted Aids</b>	Computer, software	
<b>Work methods and educational activities</b>	Project supervision in project groups Substantive supervision during consultation meetings In addition, lectures focus on applying different layers in a software application, such as a user interface layer, logic layer and database layer.	
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>All projects are subject to compulsory attendance and active participation (see also article 27a). The rules may differ per project and will be published on Moodle.</p> <p>Insufficient contribution to or obstruction of group work may be penalised. In the first instance students receive a warning, a second breach leads to a yellow card and a third breach to ejection from the project group (red card). For further details of the disciplinary policy, please refer to the project manual and the relevant Moodle Course.</p>	
<b><u>Module with test</u></b>	Process dossier	1921IN138B	
<b>Assessment objectives/criteria</b>	<p>On completion of this module, students are able to:</p> <ol style="list-style-type: none"><li>1. List a project 's features;</li><li>2. List the tasks, responsibilities and roles of the people working on a project;</li><li>3. Indicate how a project should be organised and managed;</li><li>4. List channels of communication within the project;</li><li>5. List requirements for collaboration in groups;</li><li>6. List the main principles, terms and concepts regarding project work and translate these to a real-life context.</li></ol>		
<b>Details of assessments</b>	Andere wijze without test session		
<b>Permitted Aids</b>	None		
<b>Work methods and educational activities</b>	<p>Literature:</p> <ul style="list-style-type: none"><li>- Project-based work manual</li></ul> <p>4 Contact hours:</p> <ul style="list-style-type: none"><li>• Two lectures process dossier (introduction), combined with project tutoring</li></ul>		
<b>Contact hours for strategies and teaching activities</b>			
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee		

## Project Management 1 [ 1921IN135Z ]

Academic year	Term	Name of examination component	Study load in credits
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1	blok 3	Project Management 1	2
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Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Projectmanagement 1 [ 1918IN135A ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	<p>This course consists of two parts:</p> <ol style="list-style-type: none"> <li>1. Lectures project management in which students acquire knowledge and understanding of the basic concepts of and relating to project work and the various aspects of project management</li> <li>2. During the lectures Project skills, related to the project tutoring students acquire skills related to working in project teams, like setting individual goals, working on a team contract, writing a project plan, making a project file and teamwork in general. The acquired skills through lectures will be assessed during the project tutoring of term 1.4 in writing a project plan.</li> </ol>
<b>Learning outcomes</b>	<p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• <b>1.1 Self-direction</b> Is able to operate in critical situations in an independent, results-oriented and stress-free manner. Is enterprising, shows initiative and dares to take risks. Recognises personal focus points and formulates learning goals based on feedback and self-reflection. Is good at planning and organising, monitoring milestones and deadlines, and honours commitments. Is able to identify, integrate and apply relevant knowledge and insights in every new situation. Takes personal duties and responsibilities seriously.</li> </ul> <p><b><u>Research skills:</u></b></p> <ul style="list-style-type: none"> <li>• 1.1 Map out the relevant aspects of a simple problem.</li> <li>• 1.3 Handle a problem in a systematic way.</li> <li>• 1.5 Process the provided and collected information</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No



<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Projectmanagement 1	1918IN135A
<b>Assessment objectives/criteria</b>	1. List the main principles, terms and concepts regarding project work and translate these to a real-life context.	
<b>Details of assessments</b>	Schriftelijk with test session	On completion of this module, students are able to: 1. List the features of a project. 2. Name the tasks, responsibilities and powers of people in a project. 3. Indicate how a project should be organised and controlled. 4. Name the channels of communication within the project. 5. List the prerequisites for collaboration in groups. 6. Students know the main terms and concepts with regard to project work and are able to translate these to a practical setting. 7. The student has knowledge of the system development methods and is able to use them in projects. Written exam for the part Project management based on the book Project management by Roel Grit e.a. and sheets used in the lessons
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Seven lectures on project management/system development	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Interaction Design [ 1917IN142Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination</b>	<b>Study load in credits</b>
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		<b>component</b>	
1	blok 4	Interaction Design	3

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
Interaction Design [ 1913IC142A ]	50%	GRD (1 t/m 100)	55	42
Design document [ 1917IN142B ]	50%	GRD (1 t/m 100)	55	42

<b>Content of unit of study</b>	<p>The starting point for interaction design is understanding and practicing user centered design. This means optimizing the functionality and flow of an application, taking into account the context of use and the target user group. By focusing on the user, right from the start and investigating what cognitive factors, attitude, behavior and expectations are important to a user, interaction designers provide important input and an essential contribution to the development and creation of a good product. The classes look at the following topics:</p> <ul style="list-style-type: none"> <li>• Introduction to Interaction Design;</li> <li>• Debrief and prioritization using the MoSCoW method;</li> <li>• Personas;</li> <li>• Scenario based design and (Paper) Prototyping ;</li> <li>• Evaluation of the prototype based on Expert evaluation and Usertesting;</li> <li>• Redesign.</li> </ul>
<b>Learning outcomes</b>	<p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>• 1.1 Identification of the core elements of an external assignment whereby clarification is sought from the client, users and experts. (UI)</li> <li>• 1.2 Taking inventory at the client and of the user needs and translating these into IT solutions. (UI)</li> <li>• 1.3 Getting acquainted with the existing interactive concepts, services and products. (UI)</li> <li>• 1.4 Analysis of a certain organisational process, organisation, data stream, data need and process control at an operational level. (OP)</li> <li>• 1.5 Analysis of bottlenecks and cause-effect relationships from the perspective of the information provision. (OP)</li> </ul>

	<ul style="list-style-type: none"> <li>2.2 Analysis of the client's core values, products or services, user needs and how these are expressed in the products or services. (UI)</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>1.1 Translate the advisories into a simple user interaction with standard prototyping technique. (UI)</li> <li>1.3 Apply and carry out a standard interaction design process, including user-centered design. (UI)</li> </ul> <p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>1.1 Realise and qualitatively test simple interactive products or services on the basis of an interactive design whereby use is made of accessible tools, design guidelines and/or house style. (UI)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	Tools and literature that will be used during this course will be published on Moodle.

<b><u>Module with test</u></b>	Interaction Design	1913IC142A
<b>Assessment objectives/criteria</b>	<p>The student demonstrates understanding in the user centered design and the communication driven-design process:</p> <p>Assessment components and weighting:</p> <ul style="list-style-type: none"> <li>Exam (individual knowledge test) 50%;</li> <li>A satisfactory grade is required for both the exam and the design document.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written test with multiple-choice and open questions on the theory covered.
<b>Permitted Aids</b>	For the written exam, no aids are permitted.	
<b>Work methods and educational activities</b>	<p>Lecture/seminar</p> <p>Classes consist of a theoretical section and practical assignments.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Design document	1917IN142B

<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"><li>• Complete a user requirements analysis based on a briefing and research;</li><li>• Define one or more target groups based on a briefing and research;</li><li>• Design and justify functionality matching the user requirements, task analysis and defined target groups;</li><li>• Using a user scenario to create a suitable UI and workflow design and using the scenario correctly for user testing.</li><li>• Create a (Paper) Prototype (mock-up): visualisation of the user interface, interactions and processes associated with the defined functionalities and target groups;</li><li>• Apply a Heuristic Analysis (J. Nielsen) to the prototype: characterise application methods for problems and errors and define one or more solutions;</li><li>• Complete and justify a redesign and iteration.</li></ul> <p>Assessment components and weighting:</p> <ul style="list-style-type: none"><li>• Design document /prototype (group assignment) 50%;</li><li>• Asatisfactory grade is required for both the exam and the design document.</li></ul>		
<b>Details of assessments</b>	Schriftelijk without test session	Design document consolidating the various elements and explaining the design. Completing a user test/expert evaluation, recording the findings and adjusting the design are all part of the design document.	
<b>Permitted Aids</b>	Computer, and required software for making the assignments.		
<b>Work methods and educational activities</b>	Lecture/seminar Classes consist of a theoretical section and practical assignments.		
<b>Contact hours for strategies and teaching activities</b>			
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee		

## Communication 2 [ 1918IN143Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 4	Communication 2	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
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Presentation [ 1918IN143A ]	100%	GRD (1 t/m 100)	55	28
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<b>Content of unit of study</b>	<p>In this study unit students improve their communication skills regarding professional communication. The subjects that will be addressed during this term is presentation skills. During the lectures students improve their presenting skills by doing short and creative assignments concerning public speaking/ presenting in class. A final individual presentation of 7 to 10 minutes will complete this study unit. Feedback is an important part of the project, not only from the lecturer but also from peers. The final project presentation will be assessed at the end of this term and will be assessed by the communication lecturer. Both parts need to be passed to round off this course.</p>
<b>Learning outcomes</b>	<p><u>Professionalisation:</u></p> <p>1.1 Self-direction</p> <ul style="list-style-type: none"> <li>• Recognises personal focus points and formulates learning goals based on feedback and self-reflection.</li> <li>• Takes personal duties and responsibilities seriously.</li> </ul> <p>1.2 Social-communicative skills</p> <ul style="list-style-type: none"> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Is able to give and receive feedback.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> </ul> <p>1.3 Creativity and problem-solving skills</p> <ul style="list-style-type: none"> <li>• Comes up with new ideas, approaches or insights.</li> <li>• Research skills</li> <li>• 1.1 Map out the relevant aspects of a simple problem.</li> <li>• 1.4 Use sources when approaching a problem.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b>Module with test</b>	Presentation	1918IN143A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Use audio visual tools like PowerPoint or Prezi during a 7- to 10-minute presentation;</li> <li>• The PowerPoint/ Prezi presentation has a clear and logic structure including an index;</li> <li>• Use proper verbal- (language, intonation, volume, interaction) as well as non-verbal (eye contact, posture, body language, mimic) communication to engage the audience;</li> <li>• Interact with the audience and keep their interest throughout the presentation;</li> <li>• During this study unit, students monitor their improvements/ developments closely on an assessment form, on which feedback is written. The student takes the feedback and learning perspectives into account. Based on this assessment form the student is able to write a reflection, which shows his/ her development.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	An individual presentation as well as being able to present as a group, in which every team member is responsible for a part of the presentation.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Seminars	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Attendance during the lectures is vital in order to monitor the development and assessed accordingly based on the feedback given during the seminars.

## Design Patterns [ 1918IN144Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 4	Design Patterns	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Design Patterns [ 1918IN144A ]	100%	GRD (1 t/m 100)	55	84

Assignments Design Patterns [ 1918IN144B ]	0%	SUS (Voldoende / Onvoldoende)	V	0
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<b>Content of unit of study</b>	<p>Introduction to recognizing and implementing (software) design patterns. The following subjects will be discussed:</p> <ul style="list-style-type: none"> <li>• Interfaces</li> <li>• Template pattern</li> <li>• Observer pattern</li> <li>• MVC pattern</li> <li>• Strategy pattern</li> <li>• Adapter pattern</li> <li>• Singleton pattern</li> <li>• State pattern</li> <li>• Factory patterns</li> </ul>
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>• 1.10 Analyse a simple problem and create an algorithm to solve it. (SW)</li> </ul> <p><b><u>Realisation:</u></b></p> <ul style="list-style-type: none"> <li>• 1.6 Build, test and make available a simple software system. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Design Patterns	1918IN144A
<b>Assessment objectives/criteria</b>	The student is able to recognise various Design Patterns in a given context, and apply (implement) them correctly in an application.	
<b>Details of assessments</b>	Schriftelijk with test session	<p>The module is assessed with a practical exam, in which, a student individually completes a set of assignments in C# with Visual Studio.</p> <p>In the assignments a specific feature needs to be build. Students need to select the appropriate Design Pattern and implement it correctly.</p>
<b>Permitted Aids</b>	IDE (Visual Studio)	

<b>Work methods and educational activities</b>	Lectures, practical classes and assignments	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Assignments Design Patterns	1918IN144B
<b>Assessment objectives/criteria</b>	The student is able to recognize a number of Design Patterns (see module guide for details) and apply them correctly (implement) in an application. Based on specific context the student is capable of selecting the right pattern and implement it correctly.	
<b>Details of assessments</b>	Andere wijze without test session	The mandatory assignments will be reviewed during the practical classes. If the assignments are not approved, students get a second attempt in the next term.
<b>Permitted Aids</b>	IDE (Visual Studio)	
<b>Work methods and educational activities</b>	Students start working on the mandatory assignments during the practical classes; the assignments must be approved at the latest before the next practical class. The assignments must be completed individually.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Building applications [ 1921IN145Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 4	Project Building applications	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Building applications [ 1918IN145A ]	80%	GRD (1 t/m 100)	55	84
Project documentation [ 1918IN145B ]	20%	GRD (1 t/m 100)	55	14



Process dossier [ 1919IN145C ]	0%	SUS (Voldoende / Onvoldoende)	V	14
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<b>Content of unit of study</b>	Analyzing, designing and building an object-oriented application with an underlying SQL database in a group context, where project documentation is maintained.
<b>Learning outcomes</b>	<p><b><u>Manage &amp; Control:</u></b></p> <ul style="list-style-type: none"> <li>1.5. Organise and make use of a management system to support the software development in teams. (SW)</li> </ul> <p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>1.7. Collect and validate functional requirements for a software system with one stakeholder according to a standard method. (SW)</li> </ul> <p><b><u>Design:</u></b></p> <ul style="list-style-type: none"> <li>1.6. Create a design for a software system, including a data base with model techniques according to a standard method. (SW)</li> </ul> <p><b><u>Realisation:</u></b></p> <ul style="list-style-type: none"> <li>1.6. Build, test and make available a simple software system. The set-up, filling and querying of a data base is part of the software system. (SW)</li> </ul> <p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>1.1 Self-managing ability;</li> <li>1.2 Social communicative competence;</li> <li>1.3 Creativity and problem-solving skills;</li> <li>1.4 Awareness of social responsibility.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Building applications	1918IN145A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Collect and validate functional requirements for a software system;</li> <li>Set up an application using a layered architecture based on the identified functional requirements; More specifically: Build, test and make available a simple object-oriented information system (using a database);</li> </ul>	

	<ul style="list-style-type: none"> <li>• Using a management system to support team-based software development, the student can demonstrate relevant contribution to the project;</li> <li>• Demonstrate that he/she has actually developed the above components himself/herself by explaining how they work and answering questions about them;</li> <li>• Explain and substantiate how he/she arrived at the choice of particular programming solutions;</li> <li>• Explain the OO concepts used (classes, inheritance, properties, access modifiers, ...);</li> <li>• Explain the software architecture/layers;</li> <li>• Explain database components (e.g. SQL queries, SQL parameters);</li> <li>• Write clear, logical, safe and efficient code;</li> <li>• Implement a graphical user interface, using a universal corporate identity through inheritance.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p>The team demonstrates fully correct operation of the application.</p> <p>Next, during an individual code assessment, each student demonstrates his/her developed part of the application and answers questions about it.</p>
<b>Permitted Aids</b>	PC, required software	
<b>Work methods and educational activities</b>	<p>Project supervision in project groups.</p> <p>Project consultancy during consultation meetings.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Mandatory attendance and active participation applies to all projects (see also article 27a). The rules of the game may differ per project and are published on Moodle.</p> <p>Insufficient cooperation or opposition in group work can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card).</p> <p>For further details of the sanctions policy, please refer to the project manual and the relevant Moodle Course.</p>

<b><u>Module with test</u></b>	Project documentation	1918IN145B
<b>Assessment objectives/criteria</b>	<p>The student can:</p> <ul style="list-style-type: none"> <li>• Using an entity relations diagram (ERD), create a design for the relational database used in the project;</li> <li>• Using use case descriptions and use case diagrams (UML) to clarify the interaction between users and system;</li> <li>• Using a class diagram (UML) to clarify the hierarchy and structure of the code.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Written task; Hand-in on Moodle
<b>Permitted Aids</b>	PC, required software	
<b>Work methods and educational activities</b>	The student receives project consultancy every two weeks.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Mandatory attendance and active participation applies to all projects (see also article 27a). The rules of the game may differ per project and are published on Moodle.</p> <p>Insufficient cooperation or opposition in group work can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card). For further details of the sanctions policy, please refer to the project manual and the relevant Moodle Course.</p>
<b><u>Module with test</u></b>	Process dossier	1919IN145C
<b>Assessment objectives/criteria</b>	<p>The students draw up a cooperation agreement in a group context. The students by turns make the agenda and minutes of the project supervision meetings. In addition, the students reflect on the development of their (project) skills and those of their fellow students by means of evaluation forms (peer and self-evaluation)</p> <p>Test criteria,</p> <ul style="list-style-type: none"> <li>• Active contribution to all project management meetings</li> <li>completeness of the following documents (on Moodle): <ul style="list-style-type: none"> <li>◦ Collaboration agreement</li> <li>◦ Agenda and minutes</li> <li>◦ Retro evaluation form</li> <li>◦ Project plan sufficient/insufficient</li> </ul> </li> </ul>	

<b>Details of assessments</b>	Schriftelijk without test session	Required documents must be handed-in and sufficient.
<b>Permitted Aids</b>	PC, required software	
<b>Work methods and educational activities</b>	The student receives project supervision every two weeks.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Failing to cooperate or deliberately failing to cooperate or work together as a team will be met accordingly with sanctions to those involved. First Sanction/ penalty is a warning. Second sanction/ penalty is a yellow card. Third sanction/ penalty is a red card, which means you will be disqualified from the project. The project member will be led before the exam commission to be expelled from the project. This also means the student has a fail and will have to resit/ retake the project/ exam.

## Professional Skills Year 1b [ 1920IN147Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 4	Professional Skills Year 1b	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 1b [ 1920IN147A ]	100%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>Professional skills helps students gain an understanding of:</p> <ul style="list-style-type: none"> <li>• Themselves, their motives for participating in the programme, interests, expectations, style of working and learning, way of planning and structuring their studies and way of collaboration;</li> <li>• The programme and future professional career, the competencies the programme</li> </ul>
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	<p>provides training in, the different options within the programme and the possible majors;</p> <ul style="list-style-type: none"> <li>• Their educational and professional career and to reflect on the experiences and the choices that can be made in this respect;</li> <li>• The way of planning and structuring their studies and writing a personal development plan (PDP) reflecting their own development and new insights concerning items 1 to 3.</li> </ul> <p>In term 4 a guest lecture provides students with an overview of the job options in their profession (labour market orientation).</p>
<b>Learning outcomes</b>	<p><u>Competency Professionalisation:</u></p> <ul style="list-style-type: none"> <li>• 1.1 Self-direction;</li> <li>• 1.2 Social-communicative skills;</li> <li>• 1.4 Awareness of social responsibility.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Professional Skills Year 1b	1920IN147A
<b>Assessment objectives/criteria</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Describe their own learning needs and translate these into SMART objectives in a personal development plan (PDP);</li> <li>• Systematically work on their own academic and professional development concerning knowledge, skills and attitude;</li> <li>• Reflect on their own (personal and study) experiences, their own way of working during their studies, their achieved results and their own performance as a team member based on feedback;</li> <li>• Take action in order to enhance their knowledge and skills in the areas of the programme and their future profession;</li> <li>• Discuss work experiences and their own performance with fellow students and learn from that;</li> <li>• Adjust their performance as a team member to others within the team and within the organisation based on feedback;</li> <li>• Create a team profile based on guidelines;</li> <li>• List the requirements demanded of a professional in the professional area;</li> <li>• Based on professional requirements, feedback and reflection choose a direction within the professional area;</li> <li>• Collect their results in a personal portfolio.</li> </ul>	

<b>Details of assessments</b>	Andere wijze without test session	<p>Written and oral (assignments and discussions):</p> <ul style="list-style-type: none"> <li>• Attendance at lectures (at least 80%) S/U (Satisfactory/Unsatisfactory);</li> <li>• Assessment discussion (grade);</li> <li>• Written reports S/U.</li> </ul> <p>Students only receive their grade after completing both lecture attendance and written reports with an S.</p>
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	<p>Three lectures per term, assignments and an individual talk. <u>Material:</u></p> <ul style="list-style-type: none"> <li>• Syllabus Professional Skills year 1.</li> <li>• Roel Grit e.a.: Managing your competences.</li> </ul> <p>Assessment discussion: students must attend their assessment discussion. If a student does not attend, a No Show assessment will be issued (1st attempt). The discussion may be repeated in the resit period (2d attempt).</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>The professional skills classes are interactive by nature. During the classes personal experiences and assignments are discussed and shared, including providing mutual feedback and shared reflection. Because the classes revolve around the group process, all students are required to attend at least 80% of the classes. If a student has not met the compulsory attendance requirement, a substitute assignment will be issued. Individual coaching meeting: students must attend the individual meeting. If a student does not attend, a No Show assessment will be issued (1st attempt). The discussion may be repeated in the resit period (2d attempt).</p> <p>Insufficient contribution to or obstruction of group work may be penalised. In the first instance students receive a warning, a second breach leads to a yellow card and a third breach to ejection from the project group (red card).</p>

For further details of the disciplinary policy, please refer to the project manual and the relevant Moodle Course.

## Web Markup [ 1923IN111Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 1	Web Markup	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Web Markup [ 1918IN111A ]	100%	GRD (1 t/m 100)	55	112

<b>Content of unit of study</b>	In this study unit students compile a website in HTML5 and CSS3.
<b>Learning outcomes</b>	<p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>1.5 Organise, test and make available of a local/small infrastructure. (IS)</li> <li>1.6 Build, test and make available a simple software system. The set-up, filling and querying of a data base is part of the software system. (SW)</li> </ul> <p><b>Manage &amp; Control:</b></p> <ul style="list-style-type: none"> <li>1.5 Organise and make use of a management system to support the software development in teams. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b>Module with test</b>	Web Markup	1918IN111A
<b>Assessment objectives/criteria</b>	<p>The final product of the website has the following prerequisites:</p> <ul style="list-style-type: none"> <li>The website is available on a hosting server (single files/documents will not be validated);</li> <li>The URL of the website will be emailed to the lecturer before the final exam date;</li> </ul>	

	<ul style="list-style-type: none"> <li>• correct validation will be done with the W3C HTML Validation service and the W3C CSS validation, in which correct means: no errors;</li> <li>• Public availability without the use of authentic login;</li> <li>• The website has to apply to the proper semantics;</li> <li>• The website has to comply to the design/ format provided by the course;</li> <li>• The website has to be responsive;</li> <li>• Sources of comments, images, photo's, video material or any other media material have to be made available;</li> <li>• The use of Bootstrap, WordPress or any other framework is prohibited.</li> </ul> <p>Please note: if the website was not submitted or the URL has not been sent via e-mail to the lecturer a NS (NoShow) will be issued.</p> <p>However, if the website is submitted, yet does not comply to the prerequisites, the mark 10 (10-100) will be issued.</p> <p>The following requirements for the website are mandatory, which also comply to the prerequisites:</p> <ul style="list-style-type: none"> <li>• Clear and recognizable page names of which each page is finalized with HTML;</li> <li>• The site is validated beforehand and possible errors have to be solved. (during the assessment the website may not hold any errors, they may hold warnings);</li> <li>• Correct application of HTML5 structure;</li> <li>• Correct application of CSS(3) design.</li> </ul> <p>Please note:</p> <p>The teacher has the liberty to change the content of certain lectures and requirements however he sees fit. Please keep an eye on Moodle to see whether any changes have been put forward.</p>	
<b>Details of assessments</b>	Andere wijze without test session	The product "the website" will be assessed at the end of the term and provided with a mark.
<b>Permitted Aids</b>	PC/ MAC, internet and software to compile the webpage ( students are free to choose Notepad++, Brackets or Visual Studio). Hosting account will be provided by the course (as a service).	
<b>Work methods and educational activities</b>	<p>Starting the lectures, theory is discussed, followed by practical assignments. The students are provided with a theoretic framework during the lectures Webmarkup.</p> <p>Students receive support during the lectures to realise the final product "the website".</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	



# Web Design [ 1923IN112Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 1	Web Design	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Web Design [ 1918IN112A ]	100%	GRD (1 t/m 100)	55	112

<b>Content of unit of study</b>	Students gain an understanding of the various disciplines belonging to Web Design.
<b>Learning outcomes</b>	<p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>1.1 Identification of the core elements of an external assignment whereby clarification is sought from the client, users and experts. (UI)</li> <li>1.2 Taking inventory at the client and of the user needs and translating these into IT solutions. (UI)</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>1.1 Translate the advisories into a simple user interaction with standard prototyping technique. (UI)</li> <li>1.3 Apply and carry out a standard interaction design process, including user-centered design. (UI)</li> </ul> <p>Above competencies apply to the Architectural layer "User interaction" in the Domain description Bachelor of ICT.</p>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	Tools and literature that will be used during this course will be published on Moodle.

<b>Module with test</b>	Web Design	1918IN112A
<b>Assessment objectives/criteria</b>	During classes and as homework, students complete a number of assignments as preliminary work for the website design	

	<p>assignment and to practise specific skills in the design tool(s). All these assignments need to meet the requirements. The web design principles learned are applied when designing the website.</p> <p>The web design will be assessed based on the mastery of both mastering the tool and design principles.</p> <p>The Web Design assessment consists of 2 parts:</p> <ul style="list-style-type: none"> <li>• Various preliminary tasks for the website such as a project proposal, content, wireframes and design variants</li> <li>• Designing a website for a specific audience, with a specific message.</li> </ul> <p>In order to get a final grade the project proposal needs to be sufficient, received a "Go".</p> <p><b>Principles of web design</b></p> <p>Students are able to create a design which:</p> <ul style="list-style-type: none"> <li>• Suitable for the target audience;</li> <li>• Communicates a clear message;</li> <li>• Utilizes a clear navigation and menu structure including feedback to the user where he is in the website;</li> <li>• Has consistent styling: layout, formatting, use of colours and fonts;</li> <li>• Includes an appropriate logo.</li> </ul> <p><b>Skills in image editing / prototyping tool</b></p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Create a (photo) realistic design using the assigned editing tool. For example Figma;</li> <li>• Create own content (at least containing text and pictures).</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Other format; both the documented design process (logbook) and final design (prototype) need to be handed in.
<b>Permitted Aids</b>	To do the assignments a computer, the necessary software and a digital camera are needed.	
<b>Work methods and educational activities</b>	Lectures on theory combined with practical exercises.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Programming 1 [ 1923IN113Z ]

Academic year	Term	Name of examination component	Study load in credits
1	blok 1	Programming 1	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Programming 1 [ 1918IN113A ]	100%	GRD (1 t/m 100)	55	112
Assignments Programming 1 [ 1918IN113B ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	<p>Students learn to build, test and provide access to simple Console and Windows Forms applications using a development environment. The following topics are covered:</p> <ul style="list-style-type: none"> <li>• Basic principles of coding;</li> <li>• Structured coding in C#;</li> <li>• Analysing a programmable problem;</li> <li>• Implementing an algorithm for a programmable problem.</li> </ul>
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>• 1.10 Analyse a simple problem and create an algorithm to solve it. (SW)</li> </ul> <p><b><u>Realisation:</u></b></p> <ul style="list-style-type: none"> <li>• 1.7 Build, test and make available a simple software system. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	propedeuse
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Programming 1	1918IN113A
<b>Assessment objectives/criteria</b>	<p>Students can build, test and provide access to simple Console and Windows Forms applications using a development environment. Skills assessed include:</p> <ul style="list-style-type: none"> <li>• Analyse a programmable problem and implement a suitable algorithm;</li> <li>• Declare and use variables and constants;</li> <li>• Apply sequence statements;</li> <li>• Apply selection statements (if/switch) for conditional statements;</li> <li>• Apply iteration statements (for/while/do-while) for repetition of statements, and flow control (break/continue/return);</li> <li>• Apply methods;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Declare and use arrays.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Practical exam, students must individually implement a number of programs using C# in a development environment (Visual Studio).
<b>Permitted Aids</b>	IDE (Visual Studio)	
<b>Work methods and educational activities</b>	Lectures, practical classes and assignments	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Assignments Programming 1	1918IN113B
<b>Assessment objectives/criteria</b>	See assessments objectives/criteria module "Programming 1".	
<b>Details of assessments</b>	Andere wijze without test session	The mandatory assignments are checked partially automatically and partially manually (by practical teacher), and feedback is given on the code. If the assignments are not approved, students get a second chance in the next term.
<b>Permitted Aids</b>	IDE (Visual Studio)	
<b>Work methods and educational activities</b>	<p>Students start working on the mandatory assignments during the practical classes; the assignments must be handed-in at the latest before the next practical class.</p> <p>The assignments must be completed individually.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Java Fundamentals [ 1917IN232Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 1	Java Fundamentals	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
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Java Fundamentals [ 1917IN232A ]	100%	GRD (1 t/m 100)	55	84
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<b>Content of unit of study</b>	<p>This study unit pays specific attention to learning how to program in the Programming language Java and consolidate the general basics of OO-programming-skills.</p> <p>Discussed subjects:</p> <p><u>Java</u></p> <ul style="list-style-type: none"> <li>• Switch from C# to Java</li> <li>• GUI-programming with JavaFX</li> <li>• Serialization and I/O</li> <li>• Collections</li> <li>• Exception handling</li> </ul> <p><u>OO-skills</u></p> <ul style="list-style-type: none"> <li>• Apply Inheritance, Polymorphism and Encapsulation using classes and interfaces</li> </ul>
<b>Learning outcomes</b>	<p><u>Realisation:</u></p> <ul style="list-style-type: none"> <li>• 2.11 Build and make available a software system that is comprised of several sub-systems while using existing components. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>None.</p> <p>This module builds on the knowledge gained in the courses Programming 1, Programming 2, Programming 3 and Design Patterns.</p>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Java Fundamentals	1917IN232A
<b>Assessment objectives/criteria</b>	<p>The students implement a windowed Java- application using the discussed Java-concepts. The student used the following features correctly:</p> <ul style="list-style-type: none"> <li>• JavaFX</li> <li>• Inheritance</li> <li>• Polymorphism</li> <li>• Encapsulation</li> <li>• Collections</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Students take an individual exam. Prior to the exam students are asked to prepare

		an end assignment. During the exam the student will be asked to develop several new features for the assignment.
<b>Permitted Aids</b>	Computer, specific software, internet	
<b>Work methods and educational activities</b>	During the lectures, theory will be discussed in combination with practice seminars. The end assignment is compulsory homework.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## IT Service Management [ 1919IN231Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 1	IT Service Management	6

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
IT Service management theory [ 1918IN231A ]	50%	GRD (1 t/m 100)	55	84
Project IT Service Management [ 1918IN231B ]	50%	GRD (1 t/m 100)	55	84
Process dossier [ 1919IN231C ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	<p>ITIL is the international standard method for the management of the technical infrastructure or IT Service Management. In this module the student is becoming aware and is practicing the most important aspects of IT Service Management and ITIL.</p> <p>Topics covered are:</p> <p>The basic concepts and functions of IT Service Management;</p> <p>The concepts, phases and coherence of the Service life cycle; Principles of the phases of ITIL framework for IT Service Management:</p> <ul style="list-style-type: none"> <li>• Service Lifecycle;</li> <li>• Service Strategy;</li> <li>• Service Design;</li> <li>• Service Transition;</li> </ul>
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	<ul style="list-style-type: none"> <li>• Service Operation .</li> </ul> <p>Target of the project : creating an advisory report to set up the management of the technical infrastructure for an organisation.</p> <p>In doing so ITIL knowledge from the IT Service Management theory is applied in a practical situation.</p>
<b>Learning outcomes</b>	<p><b><u>Competency Manage &amp; Control:</u></b></p> <ul style="list-style-type: none"> <li>• 1.5 Inrichten en gebruik maken van beheersysteem ter ondersteuning van softwareontwikkeling in teamverband. (SW)</li> <li>• 2.6 Implementeren van delen van beheerprocessen. (IS)</li> <li>• 2.9 Toepassen van methoden en technieken om een software- ontwikkelproces te managen en de kwaliteit ervan te borgen. (SW)</li> </ul> <p><b><u>Competency Analysis:</u></b></p> <ul style="list-style-type: none"> <li>• 2.9 Analysing infrastructure-related incidents, problems and security threats. (IS)</li> </ul> <p><b><u>Competency Advise:</u></b></p> <ul style="list-style-type: none"> <li>• 1.3 Provide advice on improvements for a single organisational process in the area of organisation (structure), processes and information provision, while respecting the ICT options. (OP)</li> <li>• 2.4 Provide advice on solutions for bottlenecks in the area of organisation structure (and roles), (organisation)process structure, cohesion and information provision. (OP)</li> <li>• 2.6 Provide advice about the arrangement and management of an infrastructure with supported choices for (non)functional requirements, and for available technology, management models and management methods. (IS)</li> </ul> <p><b><u>Competency Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Self-direction</li> <li>• 2.2 Social-communicative skills</li> <li>• 2.3 Creativity and problem-solving skills</li> <li>• 2.4 Awareness of social responsibility</li> </ul> <p><b><u>Competency Research skills:</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Map out the relevant aspects of the problem</li> <li>• 2.2 Clearly formulate the goal and research questions based on a given case</li> <li>• 2.3 Identify an approach to systematically answer the research questions</li> <li>• 2.4 Select and use relevant sources to answer the research questions</li> <li>• 2.5 Collect and process the relevant research data</li> </ul>

	<ul style="list-style-type: none"> <li>2.6 Derive conclusions and/or recommendations from research results</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	IT Service management theory	1918IN231A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Describe the basic concepts and functions of IT Service Management.</li> <li>Describe the concepts, phases and coherence of the Service lifecycle.</li> <li>Describe the principles of the Service Strategy Phase and the Continuous</li> <li>Service improvement Phase.</li> </ul> <p>Concerning the Service Design Phase describe the principles of:</p> <ul style="list-style-type: none"> <li>Service Catalog management</li> <li>Service Level Management</li> <li>Capacity management</li> <li>Availability management</li> <li>IT Service Continuity Management.</li> </ul> <p>Concerning the Service Transition Phase describe the principles of:</p> <ul style="list-style-type: none"> <li>Change management</li> <li>Service Asset &amp; Configuration management</li> <li>Release &amp; Deployment Management.</li> </ul> <p>Concerning the Service Production Phase describe the principles of:</p> <ul style="list-style-type: none"> <li>Event management</li> <li>Incident Management</li> <li>Request Fulfillment</li> <li>Problem management</li> <li>Access Management.</li> </ul> <p>- explain the IT Service Management discipline.</p> <p>- name the key concepts of IT Service Management.</p> <p>- appoint the objectives and principles of the ITIL method.</p> <p>- explain the Application Management discipline.</p> <p>- appoint the objectives and principles of the ASL method.</p> <p>- explain the Functional Management discipline.</p> <p>- appoint the objectives and principles of the BSL method.</p>	



<b>Details of assessments</b>	Schriftelijk with test session	
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Lectures	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Project IT Service Management	1918IN231B
<b>Assessment objectives/criteria</b>	Apply acquired ITIL knowledge from the It Service Management theory lectures in a practical situation, involving: <ul style="list-style-type: none"> <li>• Analysing the technical infrastructure of an organization</li> <li>• Analyzing the Application Management process</li> <li>• Advising on implementation of relevant ITIL and ASL processes</li> <li>• creating a Service Level Agreement</li> <li>• creating vacancies for the advised ITIL/ASL functions</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Report
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Group assignment (group setup is determined in the first week). Consultation sessions.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Consultation sessions are subject to mandatory attendance
<b><u>Module with test</u></b>	Process dossier	1919IN231C
<b>Assessment objectives/criteria</b>	The students draw up a cooperation agreement in a group context. The students by turns make the agenda and minutes of the project supervision meetings. In addition, the students reflect on the development of their (project) skills and those of their fellow students by means of the retro evaluation form. <u>Test criteria:</u> <ul style="list-style-type: none"> <li>• Active contribution to all project management meetings.</li> </ul> Completeness of the following documents (on Moodle): <ul style="list-style-type: none"> <li>• Collaboration agreement</li> <li>• Agenda and minutes</li> <li>• Retro evaluation form</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	2 Contacthours: Projectmanagement
<b>Permitted Aids</b>	None.	

<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Compulsory attendance and active participation in all project activities applies to all projects (see also Article 27a). The rules of the game may differ per project and are published on Moodle.</p> <p>Insufficient active contribution and participation in the project can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card).</p> <p>For further details of the sanctions policy, reference is made to the project manual.</p>

## NoSQL [ 1920IN233Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination component</b>	<b>Study load in credits</b>
2	blok 1	NoSQL	5

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
NoSQL Project [ 1918IN233A ]	60%	GRD (1 t/m 100)	55	84
NoSQL Theory [ 1918IN233B ]	40%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>The following study components are dealt with in NoSQL: NoSQL Project and NoSQL Theory. The following topics are dealt with in NoSQL Theory:</p> <ul style="list-style-type: none"> <li>• Introduction to NoSQL;</li> <li>• Differences compared to traditional relational databases</li> <li>• Various standard software in the field of NoSQL (eg Cassandra, HBase, MongoDB, Redis, Oracle NoSQL);</li> </ul>
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	<ul style="list-style-type: none"> <li>Differences within NoSQL between Key-Value Cache, Key-Value Store, Key-Value Store (Eventually-Consistent), Key-Value Store (Ordered), Data Structures Server, Tuple Store, Object Database, Document Store, Wide Column Store , Native Multi-model Database;</li> <li>Examples of practical applications in the field of NoSQL;</li> <li>Various scientific studies and articles in the field of NoSQL;</li> <li>In NoSQL Project the student is given the opportunity to work on a NoSQL project through a series of assignments.</li> </ul>
<b>Learning outcomes</b>	<p><b>Design</b></p> <ul style="list-style-type: none"> <li>2.8 Compiling a technical design for a medium-sized infrastructure with related protection on the basis of (non) functional requirements.(IS)</li> <li>2.9 Compile a design for a software system while taking into account the use of the existing components and libraries. (SW)</li> </ul> <p><b>Realisation</b></p> <ul style="list-style-type: none"> <li>2.11 Build and make available a software system that is comprised of several sub-systems while using existing components. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	NoSQL Project	1918IN233A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Solve aspects of a problem or problem with NoSQL;</li> <li>Create a design for an application that uses NoSQL as a data storage technique;</li> <li>Realize a created design for a NoSQL application;</li> <li>Create, query, empty and fill a NoSQL database from application code;</li> <li>Make an existing application, which uses relational databases, work with a NoSQL database.</li> </ul>	
<b>Details of assessments</b>	Andere wijze	

	without test session	
<b>Permitted Aids</b>	PC, required software, reader and internet.	
<b>Work methods and educational activities</b>	Consultancy, tutoring, workshops.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b>Module with test</b>	NoSQL Theory	1918IN233B
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• describe the NoSQL concept;</li> <li>• clarify the differences between NoSQL and relational databases;</li> <li>• make recommendations based on a case how to apply NoSQL;</li> <li>• identify various advantages and disadvantages of using NoSQL;</li> <li>• provide examples of practical applications of NoSQL;</li> <li>• conduct research into and become acquainted with NoSQL in scientific journals and articles;</li> <li>• indicate differences within NoSQL between Key-Value Cache, Key-Value Store, Key-Value Store (Eventually-Consistent), Key-Value Store (Ordered), Data Structures Server, Tuple Store, Object Database, Document Store, Wide Column Store, Native Multi-model Database.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	
<b>Permitted Aids</b>	PC, required software, reader and internet.	
<b>Work methods and educational activities</b>	Lectures and seminars.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Individual Project [ 1913IN225Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 1	Individual Project	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
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Individual Project [ 1913IN225A ]	100%	GRD (1 t/m 100)	55	28
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<b>Content of unit of study</b>	The student chooses one or several small projects, which are supportive to the IT-programme and completes it/ them.
<b>Learning outcomes</b>	<u>Professionalisation:</u> 6.2.1 Self-direction <ul style="list-style-type: none"> <li>• Is enterprising, shows initiative and dares to take risks.</li> <li>• Takes personal duties and responsibilities seriously.</li> </ul> 6.2.2 Social-communicative skills <ul style="list-style-type: none"> <li>• Is able to cooperate effectively within a team.</li> <li>• Is able to communicate effectively with people in various positions/roles.</li> <li>• Is able to listen to and empathise with another person's point of view.</li> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Is able to give and receive feedback.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> </ul> 6.2.3 Creativity and problem-solving skills <ul style="list-style-type: none"> <li>• Takes substantiated decisions based on the available information and an analysis thereof and comes up with feasible solutions.</li> <li>• Comes up with new ideas, approaches or insights.</li> <li>• Comes up with various solutions to a problem.</li> </ul> 6.2.4 Awareness of social responsibility <ul style="list-style-type: none"> <li>• Shows respect and cares for people and things in his/her environment.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b>Module with test</b>	Individual Project	1913IN225A
<b>Assessment objectives/criteria</b>	The student provides the IT- programme a service. For example:	

	<ul style="list-style-type: none"> <li>• Compile a workshop for grade school students;</li> <li>• Assist lectures during classes or with first year students;</li> <li>• Promoting the programme at our open days;</li> <li>• The student may also design, develop or test assignments that are beneficial to the IT-programme. Specific arrangements can be made with the lectures offering the assignments.</li> </ul> <p>More information about possible assignments can be found in the Moodle course Information Technology General</p>	
<b>Details of assessments</b>	Andere wijze without test session	Individual evaluation conversation with the involved teacher.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	In this study unit, varying skills are practiced for example: teamwork, assistance and presentation skills or public speaking skills.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Application Design [ 1919IN211Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	Project Application Design	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Application Design [ 1915IN211A ]	100%	GRD (1 t/m 100)	55	84
Functional Documentation [ 1919IN211B ]	0%	SUS (Voldoende / Onvoldoende)	V	28
Process dossier [ 1918IN211C ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	Content of the dossier consists of different sub-documents from the different courses from term 2.2. Details and assessment can be found on Moodle.
<b>Learning outcomes</b>	<u>Analyse</u> <ul style="list-style-type: none"> <li>• 2.1 Benchmarking functionality, user interaction and UX design for the benefit of the</li> </ul>

	<p>assignment that is carried out within a company. (UI)</p> <ul style="list-style-type: none"> <li>• 2.2 Analysis of the client's core values, products or services, user needs and how these are expressed in the products or services. (UI)</li> <li>• 2.3 Evaluation of the progress of the project from the perspective of the user. (UI)</li> </ul> <p><b><u>Design</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Translate the advisories into a design of detailed user interaction with various prototyping techniques. (UI)</li> <li>• 2.2 Design a usability test with which the objectives of the iteration can be evaluated. (UI)</li> </ul> <p><b><u>Advise</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Provide well-founded, concrete advice on the interactive techniques and/or interactive concepts to be used. (UI)</li> </ul> <p><b><u>Realisation</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Realise the interactive design with various tools and techniques. (UI)</li> </ul> <p><b><u>Competency Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Self-direction</li> <li>• 2.2 Social-communicative skills</li> <li>• 2.3 Creativity and problem-solving skills</li> <li>• 2.4 Awareness of social responsibility</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Application Design	1915IN211A
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>• Problem analyses;</li> <li>• Target group analyses / personas;</li> <li>• Requirements analyses;</li> <li>• Create User scenarios / flows per event;</li> <li>• Graphic design (visual design/ user interface design/ user experience design);</li> <li>• Research skills and professional development;</li> <li>• Final graphic design (desktop and mobile);</li> <li>• Final user scenario's / flows per event;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Create a working prototype, via a prototyping tool, including excessive (functional) scenarios;</li> <li>• Execution of a usability test with the prototype.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Click model (50% individual and 50% group). Details on Moodle.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<ul style="list-style-type: none"> <li>• Labs;</li> <li>• Usability test including feedback;</li> <li>• Presentations.</li> </ul>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Failing to cooperate or deliberately failing to cooperate or work together as a team will be met accordingly with sanctions to those involved.</p> <p>First Sanction/ penalty is a warning. Second sanction/ penalty is a yellow card. Third sanction/ penalty is a red card, which means you will be disqualified from the project.</p> <p>The project member will be led before the exam commission to be expelled from the project.</p> <p>This also means the student has a fail and will have to resit/ retake the project/ exam.</p>
<b><u>Module with test</u></b>	Functional Documentation	1919IN211B
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>• Problem analyses;</li> <li>• Target group analyses / personas;</li> <li>• Requirements analyses;</li> <li>• Scenarios.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Functional Documentation. Sufficient/Insufficient
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Labs and classes.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Process dossier	1918IN211C



<b>Assessment objectives/criteria</b>	<p>The students draw up a cooperation agreement in a group context. The students by turns make the agenda and minutes of the project supervision meetings. In addition, the students reflect on the development of their (project) skills and those of their fellow students by means of evaluation forms (peer and self-evaluation)</p> <p>Test criteria:</p> <ul style="list-style-type: none"> <li>• Active contribution to all project management meetings</li> <li>• completeness of the following documents (on Moodle):</li> <li>• Cooperation agreement;</li> <li>• Agenda and minutes;</li> <li>• Peer and self-evaluation forms.</li> </ul>		
<b>Details of assessments</b>	Schriftelijk without test session		
<b>Permitted Aids</b>			
<b>Work methods and educational activities</b>	Project tutoring		
<b>Contact hours for strategies and teaching activities</b>			
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Failing to cooperate or deliberately failing to cooperate or work together as a team will be met accordingly with sanctions to those involved. First Sanction/ penalty is a warning. Second sanction/ penalty is a yellow card. Third sanction/ penalty is a red card, which means you will be disqualified from the project. The project member will be led before the exam commission to be expelled from the project. This also means the student has a fail and will have to resit/ retake the project/ exam.</p>	

## Functional Modeling [ 1913IN214Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	Functional Modeling	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Functional Modeling (UML) [	100%	GRD (1 t/m 100)	55	56

1913IN214A ]				
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<b>Content of unit of study</b>	<p>Functional Modeling(UML):</p> <ul style="list-style-type: none"> <li>• During the course Introduction to Modeling you were introduced to a variety of UML diagrams and usecases;</li> <li>• During this module you will pay attention to the application of the modeling language UML and conducting/ carry out usecases;</li> <li>• When participating in ICT projects functional requirements are (often) constructed in usecase models and the data/technical requirements in a Class diagram or ERD;</li> <li>• A project deliverable in which these functional requirements are constructed is called the functional design.</li> </ul>
<b>Learning outcomes</b>	<p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>• 1.4 Analysis of a certain organisational process, organisation, data stream, data need and process control at an operational level. (OP)</li> <li>• 2.6 Record the ICT requirements from the perspective of the needs of the relevant stakeholders. (OP)</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>• 1.6 Create a design for a software system, including a data base with model techniques according to a standard method. (SW)</li> <li>• 2.9 Compile a design for a software system while taking into account the use of the existing components and libraries. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b>Module with test</b>	Functional Modeling (UML)	1913IN214A
<b>Assessment objectives/criteria</b>	<p>Based on the functional requirements you can:</p> <ul style="list-style-type: none"> <li>• Construct a usecase model for (section of a) system which consists of a usecase diagram and several usecases.</li> <li>• Construct an activity diagram for a (decision) algorithm, man-machine dialogue, business process, workflow and/ or orchestration of usecases.</li> </ul>	

	<p>Recognize relevant domain classes with attributes and associations in a domain class diagram, in particular, model elements:</p> <ul style="list-style-type: none"> <li>• Association class</li> <li>• Inheritance</li> <li>• Encapsulation</li> <li>• Derived attributes</li> <li>• Multiplicity</li> <li>• Enumeration</li> </ul> <p>Construct a protocol state diagram with regard to modeling external (visual) Processes of a (sub) system of a domain object.</p> <p>Construct a sequence diagram to model dependencies and ordering of interaction by classes with one another;</p>	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Lectures and seminars	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## User Interface Design [ 1911IN212Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	User Interface Design	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
User Interface Design [ 1911IN212A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	Designing the user interface for a specific target audience within a specific context. That is the aim within User Interface Design. The student will acquire de theoretic knowledge to be able to design a validated user interface. The course is strongly linked to the HCI-project, in which the project groups go through a full design process.
<b>Learning outcomes</b>	<p><b>Advise:</b></p> <ul style="list-style-type: none"> <li>• 2.1 Provide well-founded, concrete advice on the interactive techniques and/or interactive</li> </ul>

	<p>concepts to be used. (UI)</p> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>2.1 Translate the advisories into a design of detailed user interaction with various prototyping techniques. (UI)</li> <li>2.2 Design a usability test with which the objectives of the iteration can be evaluated. (UI)</li> </ul> <p><b>Analyse:</b></p> <ul style="list-style-type: none"> <li>2.2 Analysis of the client's core values, products or services, user needs and how these are expressed in the products or services. (UI)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdphase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	Advise module guide C1 English level is preferred.

<b>Module with test</b>	User Interface Design	1911IN212A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Identify, name and describe user interface components in their functionality and applicability.</li> <li>Analyze a user interface for the above elements and make proposals for improvement.</li> <li>Design a user interface taking into account the qualities of interface elements and regulations regarding their form and use in different system environments.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written test
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Theory based lectures, interspersed seminars, implement and test, analyse and assignments.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Management 2 [ 1917IN214Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	Project Management 2	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Project Management 2 [ 1917IN214A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>The principles of project management from the first year are applied in a Project. Attention is paid to all phases of a project and Requirements analysis and Change management are discussed in more detail.</p> <p>Also the relationship with Project Management according to Prince II is established and knowledge of Programme Management and Portfolio Management is gained.</p> <p>Finally, the relationship between a project management theory and a system development method such as Waterfall, Iterative and Agile is discussed, and knowledge of steering Agile projects is gained.</p> <p>See further test criteria.</p>
<b>Learning outcomes</b>	<p><b>Manage &amp; Control</b></p> <ul style="list-style-type: none"> <li>2.9 Apply methods and techniques to manage a software development process and safeguard the quality (SW)</li> </ul> <p><b>Analysis</b></p> <ul style="list-style-type: none"> <li>2.1 Benchmarking functionality, user interaction and UX design for the benefit of the assignment that is carried out within a company. (UI)</li> </ul> <p><b>Research skills:</b></p> <ul style="list-style-type: none"> <li>1.4 Use sources when approaching a problem;</li> <li>2.5 Collect and process the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No

<b>Specific details</b>		None
<b>Module with test</b>	Project Management 2	1917IN214A
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Recognize and apply project activities, tasks and roles;</li> <li>• Recognize and record functionalities of a system. Find, understand and apply information about the sub-activities and documents;</li> <li>• Name the different forms of software testing;</li> <li>• Describe the principles of the Agile method;</li> <li>• Describe the principles of the Program Management and Portfolio Management:</li> <li>• Describe the general characteristics of system development methods, such as project phasing, project risks, project failure, Waterfall principle, prototyping, iterative, incremental, agile, time-boxing.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Open Questions exam.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Lectures and Seminars in which theory will be discussed. Homework is part of the assignments, but will not be marked or graded.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Web Development 1 [ 1917IN215Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	Web Development 1	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Web Development 1 [ 1917IN215A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>During this module, students will be introduced to Web Development using PHP and JavaScript. The following topics are covered related to PHP and the development of the backend of web applications:</p> <ul style="list-style-type: none"> <li>• The object oriented programming syntax;</li> <li>• Processing HTTP requests (GET and POST);</li> </ul>
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	<ul style="list-style-type: none"> <li>• Generating HTML output;</li> <li>• Implementing the MVC design pattern, including the concepts of routing and templating;</li> <li>• Working with relational databases using PDO;</li> <li>• Understanding HTTP headers and status codes;</li> <li>• Storing data between requests in Cookies and Sessions</li> <li>• Reading and writing to and from the file system.</li> </ul> <p>The following topics are covered related to JavaScript and the development of the frontend of web applications:</p> <ul style="list-style-type: none"> <li>• Working with NPM for frontend dependency management;</li> <li>• Working with build tools (such as WebPack);</li> <li>• Working with a CSS framework (such as Bootstrap);</li> <li>• Manipulating the DOM;</li> <li>• Asynchronous client/server communication;</li> <li>• Working with common HTML5 API's.</li> </ul>
<b>Learning outcomes</b>	<p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>• 2.11 Build and make available a software system that is comprised of several sub-systems while using existing components. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdphase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Web Development 1	1917IN215A
<b>Assessment objectives/criteria</b>	<p>The student is able to implement a web application which uses:</p> <ul style="list-style-type: none"> <li>• A CSS framework for consistent styling of the application;</li> <li>• Sessions (login, logout, register, forget password);</li> <li>• Techniques to prohibit code injection;</li> <li>• The object oriented programming paradigm in combination with the MVC design pattern;</li> <li>• Handling data from forms and URL's using GET and POST;</li> <li>• Database interaction;</li> <li>• API endpoints providing and processing data;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Client/server communication;</li> <li>• DOM manipulation to update parts of pages.</li> </ul> <p>The student implements the application in a publicly approachable URL (the URL will be submitted on the digital learning environment (Moodle) (via an assignment). The student will also submit the code on the digital Learning environment (Moodle) (via an assignment).</p>	
<b>Details of assessments</b>	Andere wijze without test session	Students develop an individual application. The student assures that the web application is approachable via a public URL. The application source code, the URL and any necessary login information are then submitted by the student in a Moodle assignment.
<b>Permitted Aids</b>	<ul style="list-style-type: none"> <li>• Any IDE or Code Editor;</li> <li>• A local web server for testing purposes;</li> <li>• An online hosting environment for publication of the end result;</li> <li>• FTP or SSH software for uploading files to the server;</li> <li>• Using other software is allowed, however at students own risk.</li> </ul>	
<b>Work methods and educational activities</b>	<p>Lectures and Seminars in which PHP and JavaScript theory will be discussed. Weekly assignments will be handed in throughout the module. Consults are part of the seminars and lectures. Students that are in need of extra attention are able to take part during these consults.</p> <p>Homework is part of the assignments, but will not be marked or graded.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## English [ 1911IN215Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 2	English	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
English [ 1911IN215A ]	100%	GRD (1 t/m 100)	55	56



<b>Content of unit of study</b>	<p>During the workshops students will actively work on their professional communication skills. The following areas will be covered:</p> <ul style="list-style-type: none"> <li>• Presentation skills</li> <li>• Written correspondence: business related e-mails and other written communication</li> <li>• Report writing techniques</li> <li>• Grammar and pronunciation</li> <li>• In preparation for the final project presentation, students will practice their presentation skills and receive feedback during the lessons. The project group is responsible for preparing the final presentation.</li> <li>• Writing skills will be practiced by focusing on business correspondence and report writing techniques related to the term's project.</li> <li>• For more detailed information see the Study Guide on Moodle.</li> </ul>
<b>Learning outcomes</b>	<p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 2.2 Social-communicative skills</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	English	1911IN215A
<b>Assessment objectives/criteria</b>	<p><u>Presentation skills</u> Preparation of a presentation taking into account the most important requirements regarding presentations:</p> <ul style="list-style-type: none"> <li>• Content &amp; Structure</li> <li>• Length and visual attractiveness of the presentation</li> <li>• Delivery</li> <li>• Fluency and language use</li> <li>• Interaction and Q&amp;A with peer students and lecturers.</li> </ul> <p><u>Report writing:</u></p> <ul style="list-style-type: none"> <li>• Capable of applying the report writing techniques covered during the lectures.</li> <li>• Writing a business related e-mail applying the structure and grammar covered during the lectures.</li> <li>• Detailed information regarding the assessment will be published on Moodle.</li> </ul>	
<b>Details of assessments</b>	Andere wijze	Presentation (individual, 50%)

	without test session	Management summary (group, 20%) Correspondence (business related e-mail) (individual, 30%) Assessment criteria: The minimal mark for a pass is 5,5 whereby the mark for each item must be a minimum of 4,5.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	7 weeks, 1,5 hour lectures per week; presentation skills, verbal and written assignments which are interactive by nature. Lectures and seminars Literature: see Study Guide on Moodle.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Web Application [ 1918IN221Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 3	Project Web Application	5

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Application [ 1917IN221A ]	80%	GRD (1 t/m 100)	55	112
Technical documentation [ 1918IN221B ]	20%	GRD (1 t/m 100)	55	28
Process dossier [ 1918IN221C ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	<p>The student develops a web application based on a previously created design (from the preceding term), meeting the requirements of the client as established at the start of the assignment.</p> <p>In addition to submitting (code) and demonstrating the operation and design of the completed product (through an assessment), as well as live 'hosting' of the web application (URL), the project group also prepares a process dossier. The code assessment determines the evaluation.</p>
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<b>Learning outcomes</b>	<p><b><u>Design:</u></b></p> <ul style="list-style-type: none"><li>• 2.9 Compile a design for a software system while taking into account the use of the existing components and libraries. (SW)</li></ul> <p><b><u>Realisation:</u></b></p> <ul style="list-style-type: none"><li>• 2.11 Build and make available a software system that is comprised of several sub-systems while using existing components. (SW)</li></ul> <p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"><li>• 2.1 Self-direction</li><li>• 2.2 Social-communicative skills</li><li>• 2.3 Creativity and problem-solving skills</li></ul> <p><b><u>Research Skills:</u></b></p> <ul style="list-style-type: none"><li>• 2.1 Map out the relevant aspects of the problem</li><li>• 2.2 Clearly formulate the goal and research questions based on the given case.</li><li>• 2.3 Identify an approach to systematically answer the research questions.</li><li>• 2.4 Select and use relevant sources to answer the research questions</li><li>• 2.5 Collect and process the relevant research data</li><li>• 2.6 Derive conclusions and/ or recommendations from research results</li><li>• 2.7 Critically reflect on the research approach</li></ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Yes.</p> <p>Failing to cooperate or deliberately failing to cooperate or work together as a team will be met with sanctions/ a penalty.</p> <p>First Sanction/ penalty is a warning. Second sanction/ penalty is a yellow card. Third sanction/ penalty is a red card, which means you will be disqualified. The project member will be led before the exam commission to be expelled from the project. This also means the student has a fail and will have to resit/ retake the project/ exam.</p>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Application	1917IN221A
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<b>Assessment objectives/criteria</b>	<p>The student:</p> <ul style="list-style-type: none"> <li>• Is capable of providing clear answers, which allows the student to prove a constructive and relevant contribution to the project and takes responsibility for this contribution;</li> <li>• Is able to prove the contributions are in fact made by the student by explaining choices and being able to answer questions about the code written by the student concerning code and functionality;</li> <li>• Is able to explain elaborately on choices that were made regarding certain programming solutions/ answers;</li> <li>• Is able to explain and argue how a chosen design pattern is applied to the written code;</li> <li>• Shows understanding of quality aspects on written code. Is able to recall programming solutions which were discussed in the project group, moreover, the student is able to recall what arguments and/ or problems that occurred during the project.</li> </ul> <p>In addition to the individual themes / functionalities determined with the client, the application contains at least the following functionalities:</p> <ul style="list-style-type: none"> <li>• Show the different themes / events, retrieved from the database;</li> <li>• Selecting one and / or multiple tickets for one and / or multiple events in the shopping cart;</li> <li>• Ordering one and / or multiple tickets for one and / or multiple events and receiving an order confirmation;</li> <li>• Possibility to pay with iDEAL, Paypal, Credit card via a link with a PSP API (Payment Service Provider - Application Programming Interface).</li> <li>• Possibility to receive invoice in PDF;</li> <li>• Possibility to receive tickets in PDF;</li> <li>• Link with Social Media (feed);</li> <li>• Log in, register, log out, forgot password;</li> <li>• Ability to edit, delete and add pages / events / users / orders / images / texts with a CMS (Content Management System).</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Individual assessment During an assessment, the project group, as well as very individual group member presents part of the project's result.
<b>Permitted Aids</b>	PC, Specific software	
<b>Work methods and educational activities</b>	Consultation and workshops	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Insufficient contribution to or obstruction of group work may

		be penalized. In the first instance students receive a warning; a second breach leads to a yellow card and a third breach to ejection from the project group (red card). For further details of the disciplinary policy, please refer to the project manual and the relevant Moodle Course.
<b>Module with test</b>	Technical documentation	1918IN221B
<b>Assessment objectives/criteria</b>	<p>The student can:</p> <ul style="list-style-type: none"> <li>• Provide use case descriptions and use case diagrams (UML) to clarify interaction between users and system;</li> <li>• Provide activity diagrams for every use case to clarify the flow within a use case, demonstrating the dialog between user(s) and system;</li> <li>• Using a class diagram (UML) to clarify the hierarchy and structure of the code;</li> <li>• Using a sequence diagram (UML) to show the operation and sequence of methods and exchange between different classes;</li> <li>• Using a state diagram (UML) to make the life cycle of the different classes visible;</li> <li>• Show the database structure with the help of an ERD / EER;</li> <li>• Using end-user documentation (user manual) make clear how the product can be used.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Written task; hand in Moodle.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	<p>Working independently in groups</p> <p>The student receives a bi-weekly project consultation.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Mandatory attendance and active participation applies to all projects (see also Article 27a). The rules of the game may differ per project and are published on Moodle.</p> <p>Insufficient cooperation or opposing in group work can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card).</p>

		For a more detailed interpretation of the sanction policy, reference is made to the project manual and the relevant Moodle.
<b><u>Module with test</u></b>	Process dossier	1918IN221C
<b>Assessment objectives/criteria</b>	<p>The students draw up a cooperation agreement in a group context. The students in turn make the agenda and minutes of the project supervision meetings. In addition, the students reflect on the development of their (project) skills and those of their fellow students by means of. evaluation forms (peer and self-evaluation).</p> <p>Test criteria:</p> <ul style="list-style-type: none"> <li>• Active contribution to all project management meetings</li> <li>• completeness of the following documents (on Moodle):</li> <li>• Cooperation;</li> <li>• Agenda and minutes;</li> <li>• Peer and self-evaluation forms.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Project support.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>Mandatory attendance and active participation in all project activities apply to all projects (see also Article 27a). The rules can vary per project and are published on Moodle.</p> <p>Insufficient active contribution and participation in the project can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card).</p> <p>For a more detailed interpretation of the sanctions policy, reference is made to the project manual.</p>

Academic year	Term	Name of examination component	Study load in credits
2	blok 3	Entrepreneurship & ICT	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Business Plan [ 1921OSICTA ]	0%	SUS (Voldoende / Onvoldoende)	V	28
Business Pitch [ 1921OSICTB ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	<p>The module Entrepreneurship &amp; IT develops your knowledge, insight and skills in the field of entrepreneurship in combination with IT skills. In this module, you will work in pairs to draw up a business plan for an IT company that you would like to set up in the future.</p> <p>The following aspects must be included in this business plan:</p> <ul style="list-style-type: none"> <li>• Personal motives, qualities and ambitions</li> <li>• A worked out idea of the company (including legal form)</li> <li>• A picture of the market, target groups, competition and a SWOT analysis</li> <li>• A marketing plan based on the 5 Ps</li> <li>• A financial plan with a revenue model, investment budget (one-off), financing budget (3 years) and operating budget (3 years)</li> </ul>
<b>Learning outcomes</b>	<p><b><u>Analysing:</u></b></p> <ul style="list-style-type: none"> <li>• 2.2 Analysis of the client's core values, products or services, user needs and how these are expressed in the products or services. (UI)</li> </ul> <p><b><u>Advising:</u></b></p> <ul style="list-style-type: none"> <li>• 2.4 Provide advice on solutions for bottlenecks in the area of organisation structure (and roles), (organisation)process structure, cohesion and information provision. (OP)</li> <li>• 2.5 Provide advice on new ICT possibilities, including package selection and advice. (OP)</li> </ul> <p><b><u>Research skills</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Map out the relevant aspects of the problem.</li> <li>• 2.4 Select and use relevant sources to answer the research questions.</li> <li>• 2.5 Collect and process the relevant research data.</li> <li>• 2.6 Derive conclusions and/or recommendations from research results.</li> </ul>

	<ul style="list-style-type: none"> <li>2.7 Critically reflect on the research approach.</li> </ul> <p><b>Professionalisation</b></p> <p><b>2.2 Social-communicative skills</b></p> <p>Is able to cooperate effectively within a team.</p> <p>Is able to communicate effectively with people in various positions/roles.</p> <p>Is able to listen to and empathise with another person's point of view.</p> <p>Is able to communicate knowledge, insights and skills to others.</p> <p>Is able to give and receive feedback.</p> <p>Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</p> <p>Is able to account for the achieved results and the process.</p> <p><b>2.3 Creativity and problem-solving skills</b></p> <p>Takes substantiated decisions based on the available information and an analysis thereof and comes up with feasible solutions.</p> <p>Comes up with new ideas, approaches or insights.</p> <p>Comes up with various solutions to a problem.</p>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	No
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	No

<b>Module with test</b>	Business Plan	1921OSICTA
<b>Assessment objectives/criteria</b>	<p>The student draws up a business plan containing the following aspects:</p> <ul style="list-style-type: none"> <li>Personal motives, qualities and ambitions</li> <li>A worked out idea of the company (including legal form)</li> <li>A picture of the market, target groups, competition and a SWOT analysis</li> <li>A marketing plan based on the 5 Ps</li> <li>A financial plan with a revenue model, investment budget (one-off), financing budget (3 years) and operating budget (3 years)</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Assessment takes place by means of a business plan.
<b>Permitted Aids</b>	n.a.	



<b>Work methods and educational activities</b>	Various lectures/work sessions are scheduled. During the lectures, you will be given the necessary theoretical foundation to work on the business plan in project groups under supervision. A number of consultation moments are scheduled.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Business Pitch	1921OSICTB
<b>Assessment objectives/criteria</b>	The student (in pairs) presents the relevant parts of the business plan in a convincing manner to a lender and demonstrates a viable plan.	
<b>Details of assessments</b>	Andere wijze without test session	Assessment takes place by means of a presentation.
<b>Permitted Aids</b>	n.a.	
<b>Work methods and educational activities</b>	The lectures 'Entrepreneurship and IT' are supportive and preparatory to the pitch.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Web Development 2 [ 1920IN223Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 3	Web Development 2	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Web Development 2 [ 1917IN223A ]	100%	GRD (1 t/m 100)	55	112

<b>Content of unit of study</b>	<p>This module builds on the previous module (Web Development 1).</p> <p>The following topics are covered related to the development of the backend of web applications:</p> <ul style="list-style-type: none"> <li>• Working with backend dependency management;</li> <li>• Integrating an existing external API (such as a payment provider);</li> <li>• Recognizing and mitigating common security concerns (such as injection vulnerabilities and cross-site request forgery);</li> </ul>
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	<ul style="list-style-type: none"> <li>• Running web applications inside containers;</li> <li>• Creating REST API endpoints;</li> </ul> <p>The following topics are covered related to the development of the frontend of web applications:</p> <ul style="list-style-type: none"> <li>• Working with frontend dependency management</li> <li>• Implementing an SPA (Single Page Application) in a frontend framework;</li> <li>• Structuring an application into logical parts;</li> <li>• Using routing for navigation;</li> <li>• Implementing data binding;</li> <li>• Implementing state management;</li> <li>• Communicating with a REST API;</li> <li>• Implementing security using JWT.</li> </ul>
<b>Learning outcomes</b>	<p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>• 2.11 Build and make available a software system that is comprised of several sub-systems while using existing components. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Students have prior knowledge and skills on the level of Web Development 1.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Web Development 2	1917IN223A
<b>Assessment objectives/criteria</b>	<p>The student is able to implement a web application comprising of the following parts:</p> <p>A frontend implemented using a JavaScript framework such as Vue.js for the main part of the application, that uses:</p> <ul style="list-style-type: none"> <li>• Routing;</li> <li>• Data binding;</li> <li>• State management;</li> <li>• Authentication using JWT.</li> </ul> <p>A backend using an MVC implementation that provides data to the main frontend using an API. It also uses</p> <ul style="list-style-type: none"> <li>• Routing functionality to provide a logically structured set or API URLs</li> <li>• Common practices to mitigate security risks;</li> </ul> <p>The complete application should be published to an online hosting environment.</p>	

<b>Details of assessments</b>	Andere wijze without test session	Students develop an individual application. The student assures that the web application is approachable via a public URL. The application source code including the public URL and any necessary login information are then submitted by the student in a Moodle assignment.
<b>Permitted Aids</b>	<ul style="list-style-type: none"> <li>• Any IDE or Code Editor;</li> <li>• A local web server for testing purposes;</li> <li>• An online hosting environment for publication of the end result;</li> <li>• FTP or SSH software for uploading files to the server;</li> <li>• Docker</li> <li>• Using other software is allowed, however at students own risk.</li> </ul>	
<b>Work methods and educational activities</b>	<p>Lectures and Seminars in which PHP and JavaScript theory will be discussed. Weekly assignments will be handed in throughout the module. Consults are part of the seminars and lectures. Students that are in need of extra attention are able to take part during these consults.</p> <p>Homework is part of the assignments.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Linux 2 [ 1920IN226Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 3	Linux 2	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Linux 2 [ 1918IN226A ]	50%	GRD (1 t/m 100)	55	56
Linux 2 Practical [ 1920IN226B ]	50%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	This course is a continuation of Linux 1; in this course we will expand our knowledge of Linux particularly system and user administration.
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	Furthermore common software packages such as SSH, SMB, NFS, Apache and MySQL will be discussed in detail. Network topology and installation/management of network components. The course also elaborates on the basics of bash scripting - which will be tested in a separate exam. In addition the configuration and installation of software packages and aspects of networking will be practiced.
<b>Learning outcomes</b>	<p><b><u>Manage &amp; Control:</u></b></p> <ul style="list-style-type: none"> <li>3.7 Record the specifications of a proactive management environment of a public, hybrid or private cloud infrastructure; (IS)</li> </ul> <p><b><u>Realization:</u></b></p> <ul style="list-style-type: none"> <li>2.8 Setting up a medium-sized infrastructure that meets the requirements with regard to performance, usability, security and compliance. (IS)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	Continued on Linux 1.

<b><u>Module with test</u></b>	Linux 2	1918IN226A
<b>Assessment objectives/criteria</b>	Theoretical exam covering: <ul style="list-style-type: none"> <li>User and system administration;</li> <li>Installation and configuration of software in Linux;</li> <li>Network configuration.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Multiple-choice exam.
<b>Permitted Aids</b>	Pen and scratch paper.	
<b>Work methods and educational activities</b>	Lectures and independent learning. The lectures consist of an instructional section. The assignments are completed in class and/or at home.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Linux 2 Practical	1920IN226B
<b>Assessment objectives/criteria</b>	Practical exam:	

	• Bash scripting	
<b>Details of assessments</b>	Andere wijze without test session	Practical exam, special classroom (Cisco)
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Working lecture, practice with commands and configuration.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Professional Skills Year 2a [ 1919IN227Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 3	Professional Skills Year 2a	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 2a [ 1919IN227A ]	100%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>Professional skills helps students gain an understanding of:</p> <ul style="list-style-type: none"> <li>• Themselves, their motives for participating in the programme, interests, expectations, style of working and learning, way of planning and structuring their studies and way of collaboration;</li> <li>• The programme and future professional career, the competencies the programme provides training in, the different options within the programme and the possible majors;</li> <li>• Their educational and professional career and to reflect on the experiences and the choices that can be made in this respect;</li> <li>• The way of planning and structuring their studies and writing a personal development plan (PDP) reflecting their own development and new insights concerning items 1 to 3.</li> </ul> <p>Throughout the professional skills lectures of the 2<sup>nd</sup> year, students prepare themselves for the internship during the first half year of the 3<sup>rd</sup></p>
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	<p>year as well as the specialization in the 3<sup>rd</sup> year and the profession.</p> <p>Students do research on the ICT profession and write a report, as well as present the outcomes. Students is present at the presentations from the third year interns.</p>
<b>Learning outcomes</b>	<p>6.2.1. Self-direction</p> <ul style="list-style-type: none"> <li>• Is able to operate in critical situations in an independent, results-oriented and stress-free manner.</li> <li>• Is enterprising, shows initiative and dares to take risks.</li> <li>• Recognizes personal focus points and formulates learning goals based on feedback and self-reflection.</li> <li>• Is good at planning and organising, monitoring milestones and deadlines, and honours commitments.</li> <li>• Is able to identify, integrate and apply relevant knowledge and insights in every new situation.</li> <li>• Takes personal duties and responsibilities seriously.</li> </ul> <p>6.2.2 Social-communicative skills</p> <ul style="list-style-type: none"> <li>• Is able to cooperate effectively within a team.</li> <li>• Is able to communicate effectively with people in various positions/roles.</li> <li>• Is able to listen to and empathise with another person's point of view.</li> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Is able to give and receive feedback.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> <li>• Is able to account for the achieved results and the process.</li> </ul> <p>6.2.4 Awareness of social responsibility</p> <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organisation and supports these.</li> <li>• Can handle diversity (people from various cultures and backgrounds).</li> <li>• Shows respect and cares for people and things in his/her environment.</li> </ul> <p>Research Skills</p> <ul style="list-style-type: none"> <li>• 7.2.3 Identify an approach to systematically answer the research questions.</li> <li>• 7.2.4 Select and use relevant sources to answer the research questions.</li> </ul>

	<ul style="list-style-type: none"> <li>7.2.5 Collect and process the relevant research data.</li> <li>7.2.6 Derive conclusions and/or recommendations from research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Professional Skills Year 2a	1919IN227A
<b>Assessment objectives/criteria</b>	<p>The student are able to:</p> <ul style="list-style-type: none"> <li>Describe their own learning needs and translate these into SMART objectives in a personal development plan (PDP);</li> <li>Systematically work on their own academic and professional development concerning knowledge, skills and attitudes related to the competencies of the ICT Bachelor;</li> <li>Write a report reflecting on their own (personal and study) experiences, their own way of working during their studies, their achieved results and their own performance as a team member based on feedback;</li> <li>Take action in order to enhance their knowledge and skills in the areas of the programme and their future profession;</li> <li>Discuss work experiences and their own performance with fellow students and learn from that students reflect on feedback, reflection, their strengths and weaknesses;</li> <li>Students write a resume and a letter for application for an internship, based on requirements of the professional IT-area.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Discussion and written exam (assignments and discussions)
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	<p>Three lectures throughout every term, assignments and individual coaching.</p> <p>In the first or second term, students attend presentations from third year students and write a report.</p> <p>This report is part of the student's professionalisation.</p> <p>In term 1 or 2 students attend a presentation from a third year intern and write a report about this for their labour market research.</p> <p><u>Material:</u></p> <ul style="list-style-type: none"> <li>Syllabus Professional Skills year 2.</li> <li>Roel Grit e.a.: Managing your competences.</li> </ul>	

<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>The professional skills classes are interactive by nature. During the lectures personal experiences and assignments are discussed and shared, including providing mutual feedback and shared reflection. Because the classes revolve around the group process, all students are required to attend at least 80% of the lectures. If a student has not met the compulsory attendance requirement, students will have to resit the course next year. Individual coaching meeting: Students must attend the individual coaching. If a student does not attend, a No Show assessment will be issued (1st attempt). The discussion may be repeated in the resit period (2d attempt).</p>

## Project Code Generation [ 1921IN241Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 4	Project Code Generation	6

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Code Review [ 1918IN241A ]	10%	GRD (1 t/m 100)	55	17
API design [ 1918IN241B ]	25%	GRD (1 t/m 100)	55	42
API testing [ 1918IN241C ]	25%	GRD (1 t/m 100)	55	42
Code assessment [ 1918IN241D ]	40%	GRD (1 t/m 100)	55	67
Process dossier [ 1919IN241E ]	0%	SUS (Voldoende / Onvoldoende)	V	0



<b>Content of unit of study</b>	Students design and develop a REST API for a specific purpose in a project group using a selected Java framework. Using Javascript, students give this application a rudimentary user interface, focused on the roles of stakeholders.
<b>Learning outcomes</b>	<p><u>Realize</u></p> <ul style="list-style-type: none"> <li>• 2.11 - Building and making available a software system that consists of several subsystems, making use of existing components (SW).</li> <li>• 3.9 Use test automation when performing tests (SW)</li> </ul> <p><u>Design</u></p> <ul style="list-style-type: none"> <li>• 2.9 Drawing up a design for a software system, taking into account the use of existing components and libraries; use design quality criteria. (SW)</li> <li>• 2.13 Prepare test designs according to a given test strategy (SW).</li> </ul> <p><u>Professionalisation:</u></p> <ul style="list-style-type: none"> <li>• 2.1 Self-direction</li> <li>• 2.2 Social-communicative skills</li> <li>• 2.3 Creativity and problem-solving skills</li> <li>• 2.4 Awareness of social responsibility</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Project of Year 1, term 4 must have been completed.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Code Review	1918IN241A
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>- The application meets the functional requirements.</li> <li>- User roles are adequately implemented and provided with the necessary security guarantees.</li> <li>- The code is of a decent quality and consistency.</li> <li>- The code follows the standards that fit within the framework used.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students submit a Git link to the examiners.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Project consultations, in which questions can be asked to the teachers.	

<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	API design	1918IN241B
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>- The application meets the functional requirements.</li> <li>- The application meets a RESTful design.</li> <li>- The Swagger specification provides adequate documentation.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students submit a Git link to the examiners.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Workshops in which theory and practice are alternated.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	API testing	1918IN241C
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>- The application meets the functional requirements.</li> <li>- The application is provided with a sufficient degree of unit testing.</li> <li>- The application is provided with a sufficient degree of functional tests.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students submit a Git link to the examiners.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Workshops in which theory and practice are alternated.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Code assessment	1918IN241D
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>- The relative share of the student's work.</li> <li>- The collaboration with other code.</li> <li>- The justification and explanation of design choices.</li> <li>- The quality of the chosen solution directions.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students present their code individually in the presence of examiners.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	Project Consult	

<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b>Module with test</b>	Process dossier	1919IN241E
<b>Assessment objectives/criteria</b>	<p>The students draw up a cooperation agreement in a group context. The students by turns make the agenda and minutes of the project supervision meetings. In addition, the students reflect on the development of their (project) skills and those of their fellow students by means of the retro evaluation form.</p> <p>Test criteria,</p> <ul style="list-style-type: none"> <li>• Active contribution to all project management meetings</li> <li>• completeness of the following documents (on Moodle):</li> <li>• Collaboration agreement</li> <li>• Agenda and minutes</li> <li>• Retro evaluation form</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	

## Java Advanced [ 1921IN248Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 4	Java Advanced	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Java Advanced [ 1915IN248A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>This study unit covers the development and implementation of a REST API in Java using Spring Boot.</p> <p>Subjects discussed during the lectures:</p> <ul style="list-style-type: none"> <li>• Spring Initializr;</li> <li>• Spring Boot MVC implementation;</li> <li>• Implementing REST functionality;</li> <li>• Data persistence using Spring Data JPA;</li> </ul>
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	<ul style="list-style-type: none"> <li>• Functional programming with lambda expressions;</li> <li>• Stream API;</li> <li>• SOLID design Principles;</li> <li>• Security best practices;</li> <li>• JWT authentication.</li> <li>• Unit testing</li> </ul>
<b>Learning outcomes</b>	<b>Realisation:</b> <ul style="list-style-type: none"> <li>• 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks; (SW)</li> <li>• 3.9 Application of test automation in carrying out tests. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None. This module is an extension to Java Fundamentals and strengthens students' knowledge on Java programming.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Java Advanced	1915IN248A
<b>Assessment objectives/criteria</b>	The students is able to develop a Client-Server Application in Java. The application meets the following requirements: The student is able to develop a REST API in Spring Boot, correctly using the following concepts: <ul style="list-style-type: none"> <li>• Spring Initializr;</li> <li>• Spring Boot MVC implementation;</li> <li>• Implementing REST functionality;</li> <li>• Data persistence using Spring Data JPA;</li> <li>• Functional programming with lambda expressions;</li> <li>• Stream API;</li> <li>• SOLID design Principles;</li> <li>• Security best practices;</li> <li>• JWT authentication;</li> <li>• Unit testing</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	The module is assessed with an individual practical exam. In preparation to this exam the student prepares and completes an assignment.

		During the exam the student will be asked to implement several extensions to the prepared assignment.
<b>Permitted Aids</b>	Computer, laptop, internet and specific software	
<b>Work methods and educational activities</b>	Theory and practice are part of the lectures.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Professional Skills Year 2b [ 1919IN247Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 4	Professional Skills Year 2b	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 2b [ 1919IN247A ]	100%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	<p>Professional skills helps students gain an understanding of:</p> <ul style="list-style-type: none"> <li>• Themselves, their motives for participating in the programme, interests, expectations, style of working and learning, way of planning and structuring their studies and way of collaboration;</li> <li>• The programme and future professional career, the competencies the programme provides training in, the different options within the programme and the possible majors;</li> <li>• Their educational and professional career and to reflect on the experiences and the choices that can be made in this respect;</li> <li>• The way of planning and structuring their studies and writing a personal development plan (PDP) reflecting their own development and new insights concerning items 1 to 3.</li> </ul> <p>Throughout the professional skills lectures of the 2<sup>nd</sup> year, students prepare themselves for the internship during the first half year of the 3<sup>rd</sup></p>
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	<p>year as well as the specialization in the 3<sup>rd</sup> year and the profession. Students learn how to write a good cv and cover letter. In term 4, students attend lectures on job interviewing and presenting yourself via Social Media by guest lecturers.</p>
<b>Learning outcomes</b>	<p>6.2.1. Self-direction</p> <ul style="list-style-type: none"> <li>• Is able to operate in critical situations in an independent, results-oriented and stress-free manner.</li> <li>• Is enterprising, shows initiative and dares to take risks.</li> <li>• Recognizes personal focus points and formulates learning goals based on feedback and self-reflection.</li> <li>• Is good at planning and organising, monitoring milestones and deadlines, and honours commitments.</li> <li>• Is able to identify, integrate and apply relevant knowledge and insights in every new situation.</li> <li>• Takes personal duties and responsibilities seriously.</li> </ul> <p>6.2.2 Social-communicative skills</p> <ul style="list-style-type: none"> <li>• Is able to cooperate effectively within a team.</li> <li>• Is able to communicate effectively with people in various positions/roles.</li> <li>• Is able to listen to and empathise with another person's point of view.</li> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Is able to give and receive feedback.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> <li>• Is able to account for the achieved results and the process.</li> </ul> <p>6.2.4 Awareness of social responsibility</p> <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organisation and supports these.</li> <li>• Can handle diversity (people from various cultures and backgrounds).</li> <li>• Shows respect and cares for people and things in his/her environment.</li> </ul> <p>Research Skills</p> <ul style="list-style-type: none"> <li>• 7.2.3 Identify an approach to systematically answer the research questions.</li> <li>• 7.2.4 Select and use relevant sources to answer the research questions.</li> </ul>

	<ul style="list-style-type: none"> <li>7.2.5 Collect and process the relevant research data.</li> <li>7.2.6 Derive conclusions and/or recommendations from research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Professional Skills Year 2b	1919IN247A
<b>Assessment objectives/criteria</b>	<p>The student are able to:</p> <ul style="list-style-type: none"> <li>Describe their own learning needs and translate these into SMART objectives in a personal development plan (PDP);</li> <li>Systematically work on their own academic and professional development concerning knowledge, skills and attitudes related to the competencies of the ICT Bachelor;</li> <li>Write a report reflecting on their own (personal and study) experiences, their own way of working during their studies, their achieved results and their own performance as a team member based on feedback;</li> <li>Take action in order to enhance their knowledge and skills in the areas of the programme and their future profession;</li> <li>Discuss work experiences and their own performance with fellow students and learn from that students reflect on feedback, reflection, their strengths and weaknesses;</li> <li>Students write a resume and a letter for application for an internship, based on requirements of the professional IT-area.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Discussion and written exam (assignments and discussions)
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	<p>Three lectures throughout every term, assignments and individual coaching.</p> <p>In the first or second term, students attend presentations from third year students and write a report. This report is part of the student's professionalisation. A job interviewing training is provided in term 3.</p> <p>A seminar on LinkedIn is part of the lectures in term 4. Guest lecturers will provide the job interview training as well as the LinkedIn seminar.</p> <p><u>Material:</u></p> <ul style="list-style-type: none"> <li>Syllabus Professional Skills year 2.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Roel Grit e.a.: Managing your competences.</li> </ul>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	<p>The professional skills classes are interactive by nature. During the lectures personal experiences and assignments are discussed and shared, including providing mutual feedback and shared reflection. Because the classes revolve around the group process, all students are required to attend at least 80% of the lectures. If a student has not met the compulsory attendance requirement, students will have to resit the course next year. Individual coaching meeting: students must attend the individual meeting. If a student does not attend, a No Show assessment will be issued (1st attempt). The discussion may be repeated in the resit period (2d attempt).</p>

## Social Ethical/Legal Research [ 1922IN243Z ]

Academic year	Term	Name of examination component	Study load in credits
2	blok 4	Social Ethical/Legal Research	5

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Social Ethical research [ 1922IN243A ]	50%	GRD (1 t/m 100)	55	70
Legal research [ 1922IN243B ]	50%	GRD (1 t/m 100)	55	70

<b>Content of unit of study</b>	<p>In this subject unit, different aspects and skills in relation to social-ethical and legislation are brought together. During these classes, IT related topics are analysed from an ethical and from a legal point of view. Students apply various steps of the ethical and of the legal cycle in order to</p>
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solve a problem or dilemma in a structured way. Some of the classes will focus specifically on the legal and social-ethical themed features and aspects and some classes will focus on improving of- and conducting research skills. The student has to pick a topic that is related to ICT and which has social relevancy and is current in its nature.

Students are to conduct research on this chosen topic, and are to answer how and what kind of social ethical and legal aspects are applicable to the chosen topic.

Based on the research, students are expected to deliver a research paper. In order to deliver this research paper, the students are provided with classes in effective writing to improve their skills. In this research it will be crucial to provide persuasive and convincing evidence and reasoning to support the answers in relation to the ethical and legal aspects of the chosen topic and therefore, some classes will focus on reasoning and building of persuasive answers that are supported by the evidence found in the research.

The student will learn about ethical dilemma's that occur in the professional environment related to ICT profession(s) and the student will learn to analyse these dilemma's in accordance with the ethical cycles, Royakkers en Pieters 2006. With the support of this instrument, the student is to provide a balanced conclusion that leads to professional and ethical conduct.

Furthermore, the student will receive an introduction into legal aspects that provide relevant disciplines and information as well as to provide for which laws are applicable to ICT. Moreover, the student will receive information on which search engines, research portals and tools are available to conduct research on primary legal materials, reports, judgments and legislation, legal news, text books and journals.

The student will (on individual basis) collect information from different sources, select and put the information in order (also known as desk research). The student will be taught how to apply methodology and principles in order to achieve the desk research successfully.

During this process of research and writing of the research paper, the student will receive support and feedback from the teacher/professor as well as supporting feedback of peer students. Peer feedback plays an important role.

	<p><b>6.2.1 self-direction:</b></p> <ul style="list-style-type: none"> <li>• Is able to identify, integrate and apply relevant knowledge and insights in every new situation.</li> </ul> <p><b>6.2.2 Social-communicative skills;</b></p> <ul style="list-style-type: none"> <li>• Is able to communicate knowledge, insights and skills to others.</li> <li>• Is able to give and receive feedback.</li> <li>• Expresses him/herself effectively, orally and in writing, using correct, understandable and appropriate language.</li> </ul> <p><b>6.2.3 creativity and problem-solving skills;</b></p> <ul style="list-style-type: none"> <li>• Takes substantiated decisions based on the available information and an analysis thereof and comes up with feasible solutions.</li> <li>• Comes up with new ideas, approaches or insights.</li> <li>• Comes up with various solutions to a problem.</li> </ul> <p><b>6.2.4 consideration of social responsibility:</b></p> <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organisation and supports these.</li> <li>• Can handle diversity (people from various cultures and backgrounds).</li> </ul> <p><b><u>Research Skills:</u></b></p> <ul style="list-style-type: none"> <li>• 7.2.1. Map out the relevant aspects of the problem.</li> <li>• 7.2.2 Clearly formulate the goal and research questions based on a given case.</li> <li>• 7.2.3 Identify an approach to systematically answer the research questions.</li> <li>• 7.2.4 Select and use relevant sources to answer the research questions.</li> <li>• 7.2.5 Collect and process the relevant research data.</li> <li>• 7.2.6 Derive conclusions and/or recommendations from research results.</li> <li>• 7.2.7 Critically reflect on the research approach.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	None
<b>Phase of Bachelor's programme</b>	hoofdphase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b>Module with test</b>	Social Ethical research	1922IN243A
<b>Assessment objectives/criteria</b>	In the research paper, the student will be assessed on: <ul style="list-style-type: none"> <li>• quality of research set-up</li> <li>• quality of conduct of research (data construction and data analysis)</li> <li>• quality of report (including written quality of text)</li> <li>• knowledge and insight into fundamental principles and methodology of ethics (ethical cycle) en the ability to apply this in a professional environment and to analyse in ICT</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Research paper of at approximately 2000 words on a ITC related topic that is relevant and current in which the subject skills are used by the student to obtain a conclusion and practical and workable solution.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Classes and workshops in which theory and assignments will be discussed. Consultations moments and a peer review sessions.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b>Module with test</b>	Legal research	1922IN243B
<b>Assessment objectives/criteria</b>	In the research paper, the student will be assessed on: <ul style="list-style-type: none"> <li>• quality of research set-up</li> <li>• quality of conduct of research (data construction and data analysis)</li> <li>• quality of report (including written quality of text)</li> <li>• knowledge of and insight into legal issues</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Research paper of at approximately 2000 words on a ITC related topic that is relevant and current in which the subject skills are used by the student to obtain a conclusion and practical and workable solution.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Classes and workshops in which theory and assignments will be discussed. Consultations moments and a peer review sessions.	
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
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## Internship [ 1920PRSTGZ ]

Academic year	Term	Name of examination component	Study load in credits
3	semester 1	Internship	29

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Internship start document [ 1920PRSTGA ]	0%	SUS (Voldoende / Onvoldoende)	V	200
Internship Report [ 1920PRSTGB ]	80%	GRD (1 t/m 100)	55	600
End Presentation Internship [ 1920PRSTGC ]	20%	GRD (1 t/m 100)	55	12

<b>Content of unit of study</b>	<p>The internship in Year 3 lasts 20 weeks. Working in the role of an employee, students will gain experience with the performance of assignments in a company or organisation. They will do this under supervision, but with an increasing level of independence. Students will gain relevant expertise, practise professional skills and complete professional assignments in a specific field. A great deal of emphasis will be placed on the further development and refinement of the students' professional attitude and competences. By reflecting on their work experiences, students will learn to continually work on the improvement of their actions. They will also gain a better insight into what is required of them in professional practice, the extent to which the profession is right for them and the direction in which they want to develop further.</p> <p>Starting points</p> <p>The degree programme applies the following starting points in relation to the internship:</p> <ul style="list-style-type: none"> <li>• Familiarisation with professional practice;</li> <li>• Applying, expanding and deepening specialist knowledge;</li> <li>• Applying, expanding and deepening insight into structures and organisations and experiencing business cultures;</li> </ul>
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	<ul style="list-style-type: none"> <li>• Achieving the competences envisaged, as specified by the student;</li> <li>• Gaining practical skills: the ability to organise, coordinate and integrate fields, for example;</li> <li>• Gaining communication skills: the ability to hold work meetings and report and present, for example;</li> <li>• Gaining social skills: the ability to adapt, independently form an opinion, show initiative and develop a sense of responsibility, for example.</li> </ul> <p>The following components will be considered when assessing the internship:</p> <ul style="list-style-type: none"> <li>• Internship start document: satisfactory;</li> <li>• Internship report 80%;</li> <li>• End presentation internship 20%.</li> </ul> <p>Each component must be completed with a passing mark at the very least. If a component has not been completed with a passing mark, a retake period of at least five working days after the assessment will apply.</p>
<b>Learning outcomes</b>	<p>By completing an internship assignment or assignments, students will develop competences (skills). These are the skills that students will need to deliver the professional performance envisaged, subject to the integration of knowledge, skills and attitude. The internship will enable students to demonstrate their ability to apply a number of competences at Level 2 (professional competence) as part of an integrated approach.</p> <p>Students will demonstrate at least one of the following professional competences:</p> <ul style="list-style-type: none"> <li>• Students will demonstrate at least one of the following professional competences: 'design' or 'realisation'. To do this, students will need to make a demonstrable contribution to the creation of a product or design during their internship;</li> <li>• Students will also demonstrate at least one of the other professional competences: 'analysis', 'advice', 'design', 'realisation', 'manage &amp; control';</li> <li>• Finally, students will demonstrate a mastery of the 'professionalization' competence at Level 2;</li> <li>• Students must demonstrate the achievement of at least one achievement indicator at Level 2 for the competences chosen.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>In Week 3 of the term prior to the term in which students are due to start their internships, steps will be taken to establish whether or not they</p>

	<p>have met the conditions for participation in the internship. To be able to start the internship, the following entry requirements must have been met by this reference date:</p> <ul style="list-style-type: none"><li>• A minimum of 90 credits has been attained;</li><li>• The projects (group work) that fall in the same term as the internship have been completed successfully;</li><li>• Student has passed module Interviewing and Report Writing (term 1.3, 1918IN131B).</li></ul> <p>Students will be able to start their internship in any term, provided they meet all of the entry requirements by week 3 of the previous term. The reference period for anyone wanting to start an internship in term 1 is week 3 of term 4.</p> <p><i>Exception for Term 5</i></p> <p>Students who have obtained a minimum of 100 credits by the end of the academic year (term 4) may lodge a request with the internship committee prior to week 1 of term 5 in which they explain why they want to start their internship in term 1. The internship committee will make a decision in week 1 of term 5.</p> <p>No supervision will be provided in term 5. This means that the internship will take place in term 4 and term 1 of the next academic year if a student starts his internship in term 4.</p>
Phase of Bachelor's programme	hoofdfase
Qualitative requirement BSR	No
Graduation product designation	No
Sets requirement for the work environment	No
Professional part	No
Specific details	The professional internship will last a total of 20 weeks (100 working days) and will represent a total of 29 credits.

Module with test	Internship start document	1920PRSTGA
Assessment objectives/criteria	<p>A clear description is provided of the company. This should include a description of:</p> <ul style="list-style-type: none"><li>• The mission and vision;</li><li>• Products, services and clients;</li><li>• The organisational structure and processes;</li><li>• Methods and techniques used in the company;</li><li>• Interviews with two job holders.</li></ul> <p>The learning objectives have been formulated clearly and the reasons for choosing these specific learning objectives and competences (achievement indicators) has been explained;</p>	

	<p>A specific description has been provided of how the student will work on the learning objectives during the internship via the internship assignment(s) and activities;</p> <p>A clear schedule is provided, setting out the various activities, interdependencies, the time necessary and the time frame for the part of the internship assignment that is already known when the internship starts;</p> <p>The document is in compliance with reporting requirements.</p>	
<b>Details of assessments</b>	Schriftelijk without test session	During the first few weeks of a student's internship, they will get to know the company, formulate their learning objectives and plan how to achieve them by completing assignments and internship duties. See the 'Internship start document' assignment on the Moodle course for more information about this assignment.
<b>Permitted Aids</b>	N/A	
<b>Work methods and educational activities</b>	Internship, preparation of the 'Internship start document'	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	The internship will last 100 days, during which students will be present at the internship company or at school for the activities scheduled there. As the internship period lasts more than 20 weeks, there will be some slack for students to make up any time lost due to illness. If the days lost due to a student's illness cannot be made up due to the length of his or her illness, the internship student will be required to contact his supervising lecturer and the internship coordinator. It may then be decided to extend the internship, making it possible for the student to compensate the days lost.
<b><u>Module with test</u></b>	Internship Report	1920PRSTGB
<b>Assessment objectives/criteria</b>	<p>Company description</p> <ul style="list-style-type: none"> <li>• Description of duties and results;</li> <li>• STARR-based competence report;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Reflection based on the learning objectives from the internship start document and the professional attitude score list;</li> <li>• Reporting techniques;</li> <li>• In the appendix: time sheet and professional attitude score list (1 and 2).</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	See the 'final internship report' assignment on the Moodle course for a detailed description of the content of and requirements to be met by the final report
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	The student will be expected to have the ability to work on ICT projects and assignments, which he will do independently in part and partly under expert supervision. This will ensure that projects and assignments are completed as they should be. The student will be expected to produce a final internship report, including a competence report, reflection and time sheet.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	The internship will last 100 days, during which students will be present at the internship company or at school for the activities scheduled there. As the internship period lasts more than 20 weeks, there will be some slack for students to make up any time lost due to illness. If the days lost due to a student's illness cannot be made up due to the length of his or her illness, the internship student will be required to contact his supervising lecturer and the internship coordinator. It may then be decided to extend the internship, making it possible for the student to compensate the days lost.
<b><u>Module with test</u></b>	End Presentation Internship	1920PRSTGC
<b>Assessment objectives/criteria</b>	<u>Contents:</u> The presentation will provide an insight into: <ul style="list-style-type: none"> <li>• The company and the department;</li> <li>• The internship assignment, activities and objectives;</li> <li>• Results: demonstration of product or design;</li> <li>• Reflection on performance and learning objectives.</li> </ul> <u>Presentation techniques:</u>	



	<ul style="list-style-type: none"> <li>• Targeted and audience specific;</li> <li>• Coherent and structured;</li> <li>• Language use;</li> <li>• Body language;</li> <li>• Aids.</li> </ul> <u>Answers to the questions:</u> <ul style="list-style-type: none"> <li>• Clear and persuasive.</li> </ul>	
<b>Details of assessments</b>	Mondeling with test session	At the end of the internship, the student will deliver a final presentation at Inholland Haarlem (or at the company). The supervising lecturer and the company supervisor will attend the final presentation.
<b>Permitted Aids</b>	Presentation tools (PC + beamer).	
<b>Work methods and educational activities</b>	Internship, preparation and delivery of a presentation.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	If a student is not able to attend the placement evaluation day to give his final presentation, he will be awarded a NoShow (1st attempt). A retake will then be scheduled (2 <sup>nd</sup> attempt).

## Professional Skills Year 3 [ 1920PROF3Z ]

Academic year	Term	Name of examination component	Study load in credits
3	semester 1	Professional Skills Year 3	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 3 [ 1920PROF3A ]	100%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	In Years 3 and 4, students no longer attend classes for professional skills. In the last two years of their degree programme, professional skills includes one-to-one meetings with the coach and mandatory workshops.
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	<p>Students will have two scheduled one-to-one meetings with their professionalisation coach, but they can also request additional meetings. The aim of the meetings is to gauge students' academic progress (and to enable them to catch up in any areas where they are behind), to monitor the competences that they have achieved and to help them make choices with regard to a graduation track and placement. Personal circumstances that could have an adverse impact on a student's studies may also be grounds for a meeting with the study coach. The mandatory workshop is delivered by a guest lecturer from the IT working field and focuses on the labour market and applying for jobs. Students will prepare for the workshop in advance by completing an assignment. The workshops offered will help students choose their electives and a suitable graduation project and placement and with the goal of finding a job on completion of their studies.</p>
<b>Learning outcomes</b>	<p><u>Professionalisation:</u></p> <p>6.3.1 Self-management skills</p> <ul style="list-style-type: none"> <li>• Can work independently, in a results-focused way, and can deal with stress in critical situations;</li> <li>• Shows enterprise and initiative and is not afraid to take risks;</li> <li>• recognises areas where he/she could do better and formulates learning objectives based on feedback and self-reflection;</li> <li>• Is good at planning and organisation, pays attention to milestones and deadlines and meets obligations;</li> <li>• Takes his/her task and role seriously.</li> </ul> <p>6.3.2 Social-communicative ability</p> <ul style="list-style-type: none"> <li>• Can work effectively as part of a team;</li> <li>• Can communicate effectively with people in a variety of positions;</li> <li>• Can listen to and empathise with others' viewpoints;</li> <li>• Can pass on knowledge, insights and skills to others;</li> <li>• Can give and receive feedback;</li> <li>• Can report on the results achieved and the process.</li> </ul> <p>6.3.3 Awareness of social responsibility</p> <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organisation and supports both;</li> </ul>

	<ul style="list-style-type: none"> <li>• Can embrace diversity (people with different cultures and backgrounds);</li> <li>• Shows respect and care for the people and things around them.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	First year successfully completed. Professional work/ graduation internship successfully completed.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None.

<b><u>Module with test</u></b>	Professional Skills Year 3	1920PROF3A
<b>Assessment objectives/criteria</b>	<p>Assessment criteria</p> <ul style="list-style-type: none"> <li>• Reflecting on the relevant job requirements (including developments within the discipline and the professional field), relating these to own interests, strengths and weaknesses and formulating personal goals on this basis;</li> <li>• Translating personal goals and learning needs into SMART objectives in a Personal Development Plan (PDP);</li> <li>• *A structured approach to own academic and professional development in terms of knowledge, skills and attitude, in relation to Bachelor of ICT competences;</li> <li>• Reflecting in a report on own personal and academic experiences, approach to studies, professional work placement and the results achieved;</li> <li>• Taking action to develop own competences, knowledge and skills in relation to studies and future profession.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Written assignments and one-to-one meetings. At the end of Year 3, students will have a one-to-one meeting for which they will prepare a number of deliverables, such as a Personal Development Plan (PDP), a competence development report and a reflective report.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	<p>Assignments, portfolio structure and one-to-one meetings, workshop/guest lecture on the jobs market/applying for jobs and/or personal branding.</p> <p>Students work on their personal branding in conjunction with an external company and deliver an elevator pitch during the workshop.</p>	

<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	The professional skills workshop is interactive in nature. The session is used to discuss and share personal experiences and assignments. The focus is on sharing and feedback. Since the group process during the session is important, it is essential that all students attend the session. The individual talks with the coach are meant to monitor and assess the professional progress of the student and are therefore mandatory.

## Graduation [ 1914IN441Z ]

Academic year	Term	Name of examination component	Study load in credits
4	semester 2	Graduation	29

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Graduation paper [ 1914IN441A ]	70%	GRD (1 t/m 100)	55	588
Oral Exam [ 1914IN441B ]	30%	GRD (1 t/m 100)	55	224

<b>Content of unit of study</b>	<p>In the graduation project, the student is given the opportunity to independently conduct applied research in a complex situation and in a multidisciplinary environment and to apply his knowledge, insight and capabilities in an integrated manner in new or unknown circumstances.</p> <p>A graduation assignment must meet the following criteria:</p> <ol style="list-style-type: none"> <li>1. The assignment is related to the professional profile of the study programme;</li> <li>2. With the assignment you can demonstrate competency control at level 3 start competent;</li> <li>3. The company offers a context in which an optimal learning process can be guaranteed;</li> <li>4. The assignment is a realistic reflection of the professional practice;</li> </ol>
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	5. The assignment can be translated into a research question, which is elaborated in several sub-questions.
<b>Learning outcomes</b>	<p>With the graduation research and product you must demonstrate that you can apply integrated at the level of starting competence (level 3):</p> <ul style="list-style-type: none"> <li>• The competences Research and Professionalization;</li> <li>• At least two of the professional competencies of your choice: analysis, advice, design, realization;</li> <li>• At least one mastery indicator within the chosen professional competences.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To graduate In order to start the graduation process, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• The propaedeutic phase has been achieved</li> <li>• The 3rd year internship has been successfully completed.</li> <li>• A minimum of 185 ECs were obtained in week 3 of the period prior to the start of graduation (or 195 ECs at the end of this period).</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	Yes
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	The graduation project lasts a total of 20 weeks (100 working days) and represents a total of 29 EC.

<b><u>Module with test</u></b>	Graduation paper	1914IN441A
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>• Quality of the problem analysis, research question and sub-questions</li> <li>• Quality of research</li> <li>• Quality of professional product</li> <li>• Quality of the conclusions and recommendations</li> <li>• Quality of the report</li> <li>• Reflection (on research, product, competences and professional attitude)</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	Graduation is assessed on the basis of the Graduation Assessment Form for Information Technology Haarlem.
<b>Permitted Aids</b>	n/a	

<b>Work methods and educational activities</b>	Graduation research with Written Report.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	The graduation project lasts a total of 20 weeks (100 working days), during which the student is required to be present at the graduation company. If a student does not meet the compulsory attendance requirements, he will receive an unsatisfactory mark for his graduation thesis and he will have to start the graduation again.
<b><u>Module with test</u></b>	Oral Exam	1914IN441B
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>• Professional competence</li> <li>• Oral communication;</li> <li>• Reflection.</li> </ul>	
<b>Details of assessments</b>	Mondeling with test session	The student is able to justify and explain the graduation research orally.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	Presentation	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	If the student is not able to attend the oral exam, he will receive a No-Show (1st chance). Then a resit is scheduled (2nd chance).

## Professional Skills Year 4 [ 1917IN442Z ]

Academic year	Term	Name of examination component	Study load in credits
4	semester 2	Professional Skills Year 4	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Skills Year 4 [	100%	SUS (Voldoende / Onvoldoende)	V	20

<p><b>Content of unit of study</b></p>	<p>In Years 3 and 4, students no longer attend professional skills classes. In the last two years of their degree programme, professional skills includes one-to-one meetings and mandatory workshops.</p> <p>Students will have two scheduled one-to-one meetings with their study coach, but they can also request additional meetings.</p> <p>The aim of the meetings is to gauge students' academic progress (and to enable them to catch up in any areas where they are behind), to monitor the competences that they have achieved and to help them make choices with regard to a graduation track and placement. Personal circumstances that could have an adverse impact on a student's studies may also be grounds for a meeting with the study coach.</p> <p>The mandatory workshop is delivered by a guest lecturer from professional practice and focuses on the jobs market and applying for jobs. Students will prepare for the workshop in advance by completing an assignment. The workshops offered will help students choose their electives and a graduation project and placement and with finding a job on completion of their studies.</p>
<p><b>Learning outcomes</b></p>	<p><b><u>Professionalisation:</u></b></p> <p><b><u>6.3.1 Self-management skills</u></b></p> <ul style="list-style-type: none"> <li>• Can work independently, in a results-focused way, and can deal with stress in critical situations;</li> <li>• Shows enterprise and initiative and is not afraid to take risks;</li> <li>• Recognises areas where he/she could do better and formulates learning objectives based on feedback and self-reflection;</li> <li>• Is good at planning and organisation, pays attention to milestones and deadlines and meets obligations;</li> <li>• Takes his/her task and role seriously.</li> </ul> <p><b><u>6.3.2 Social-communicative ability</u></b></p> <ul style="list-style-type: none"> <li>• Can work effectively as part of a team;</li> <li>• Can communicate effectively with people in a variety of positions;</li> <li>• Can listen to and empathise with others' viewpoints;</li> <li>• Can pass on knowledge, insights and skills to others;</li> <li>• Can give and receive feedback;</li> </ul>

	<ul style="list-style-type: none"> <li>• Can report on the results achieved and the process.</li> </ul> <u>6.3.3 Awareness of social responsibility</u> <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organisation and supports both;</li> <li>• Can embrace diversity (people with different cultures and backgrounds);</li> <li>• Shows respect and care for the people and things around them.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	First year successfully completed. Professional work placement successfully completed.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	None

<b><u>Module with test</u></b>	Professional Skills Year 4	1917IN442A
<b>Assessment objectives/criteria</b>	<b><u>Assessment criteria:</u></b> <ul style="list-style-type: none"> <li>• Reflecting on the relevant job requirements (including developments within the discipline and the professional field), relating these to own interests, strengths and weaknesses and formulating personal goals on this basis;</li> <li>• Translating personal goals and learning needs into SMART objectives in a Personal Development Plan (PDP);</li> <li>• *A structured approach to own academic and professional development in terms of knowledge, skills and attitude, in relation to Bachelor of ICT competences;</li> <li>• Reflecting in a report on own personal and academic experiences, approach to studies, professional work placement and the results achieved;</li> <li>• Taking action to develop own competences, knowledge and skills in relation to studies and future profession.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Written assignments and one-to-one meetings. At the end of Year 4, students will have a one-to-one meeting for which they will prepare a number of deliverables, such as a Personal Development Plan (PDP), a competence development report and a reflective report.
<b>Permitted Aids</b>	None.	



<b>Work methods and educational activities</b>	Assignments, portfolio structure and one-to-one meetings, workshop/guest lecture on the jobs market/applying for jobs and/or personal branding. Students work on their personal branding in conjunction with an external company and deliver an elevator pitch during the workshop.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	The professional skills workshop is interactive in nature and is mandatory. The session is used to discuss and share personal experiences and assignments. The focus is on sharing and feedback. Since the group process during the session is important, it is essential that all students attend the session. The individual talks with the study coach are meant to monitor and assess the professional progress of the student and are therefore mandatory.

## Project Big Data & AI: Design [ 1922PBDAIZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Project Big Data & AI: Design	5

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Cleaned/prepared dataset [ 1922PBDAIA ]	30%	GRD (1 t/m 100)	55	42
Trained Model [ 1922PBDAIB ]	40%	GRD (1 t/m 100)	55	56
TFGD [ 1922PBDAIC ]	30%	GRD (1 t/m 100)	55	42

<b>Content of unit of study</b>	During the Big Data & AI semester, the students work in groups on four on a Big Data & AI project. The semester consists of two terms. This (Project Big Data & AI – Design) is the project of the first term. Every week there is project supervision in
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	<p>which a teacher monitors the planning, the progress and the group process. The students can also ask technical questions about the project during this supervision.</p> <p>Students come up with a plan of approach for a 'data science / computer vision / speech analysis' project.</p>
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>• 3.5 Analysis (quantitative and/or qualitative) of the current and future situation in the area of, for example, policy, strategy, alignment and architecture, while applying the most commonly used methods; (OP)</li> <li>• 3.12 Analyzing data to train the ML-system (SW);</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>• 3.10 Designing a data architecture and a model architecture (e.g. training a ML algorithm); including a testing strategy for the data and ML models (SW).</li> </ul> <p><b>Advise:</b></p> <ul style="list-style-type: none"> <li>• 2.5 Provide advice on new ICT possibilities, including package selection and advice. (OP).</li> <li>• 3.11 Advising on the data architecture and model architecture, as well as corresponding frameworks.</li> </ul> <p><b>Professionalisation:</b></p> <ul style="list-style-type: none"> <li>• 3.1 Self-steering ability;</li> <li>• 3.2 Social communication skills;</li> <li>• 3.3 Creativity and problem-solving ability;</li> <li>• 3.4 Awareness of social responsibility.</li> </ul> <p><b>Research:</b></p> <ul style="list-style-type: none"> <li>• 3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 3.5 Collecting, analyzing and interpreting the relevant research data;</li> <li>• 3.6 Link substantiated conclusions and recommendations to research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.</p>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No

<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Cleaned/prepared dataset	1922PBDAIA
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Discovering, demonstrating and predicting cause-effect changes from a large collection of data (Big Data) using artificial intelligence techniques.</li> <li>The student can present this in a presentation to the client, also makes a proof-of-concept application to validate the research and describes his findings in an advice report.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p><i>Other method (A) / assessment</i></p> <p>The student delivers the following products in preparation for the next term:</p> <ul style="list-style-type: none"> <li>A. Cleaned/prepared dataset (30%),</li> </ul> <p>The dataset is collected, cleaned, pre-processed and prepared for training a model. It consists of at least 100 files (CV), 1000 entries (DS) or a high enough number for significant analysis in equivalent/similar cases. It has been atomized where applicable.</p>
<b>Permitted Aids</b>	PC, internet, VMware Image.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Trained Model	1922PBDAIB
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Discovering, demonstrating and predicting cause-effect changes from a large collection of data (Big Data) using artificial intelligence techniques.</li> <li>The student can present this in a presentation to the client, also makes a proof-of-concept application to validate the research and describes his findings in an advice report.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p><i>Other method (A) / assessment</i></p> <p>The student delivers the following products in preparation for the next term:</p> <ul style="list-style-type: none"> <li>B. Trained Model (40%)</li> </ul>

		A description of the trained model of high quality has been given which includes at least, the programming/scripting language/chosen, the algorithm chosen, and the number of iterations chosen to train the model. Also a division between training, test and/or validation data.
<b>Permitted Aids</b>	PC, internet, VMware Image.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	TFGD	1922PBDAIC
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Discovering, demonstrating and predicting cause-effect changes from a large collection of data (Big Data) using artificial intelligence techniques.</li> <li>• The student can present this in a presentation to the client, also makes a proof-of-concept application to validate the research and describes his findings in an advice report.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p><i>Other method (A) / assessment</i></p> <p>The student delivers the following products in preparation for the next term:</p> <ul style="list-style-type: none"> <li>• C. TFGD* [Technical, Functional and Graphical Design for PoC] (30%)</li> </ul> <p>A technical, functional AND graphical design is produced that gives a reproducible insight into the inner workings of the foreseen proof-of-concept. To deliver a quality product, UML, DooML or a similar design /modeling language has been used in combination with a wireframe / click model (Axure/XD/Figma or similar).</p>
<b>Permitted Aids</b>	PC, internet, VMware Image.	
<b>Work methods and educational activities</b>		

Contact hours for strategies and teaching activities		
Compulsory attendance (See also Article 115 TER)	Ja	

## Big Data & AI Fundamentals [ 1922BDAIFZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Big Data & AI Fundamentals	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Big Data & AI Fundamentals [ 1922BDAIFA ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Recognize Big Data architectures</li> <li>• Reproduce the theory behind Big Data</li> <li>• Apply learned models</li> <li>• The student can analyze a scientific paper and apply the learned theory and models to it.</li> <li>• The student reports his findings in a presentation that is tailored to the target group (s).</li> <li>• The student makes clear to those involved how he arrived at the presented findings.</li> </ul>
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>• 2.7 Analysis of available ICT options in the field. (OP)</li> </ul> <p><b>Investigative ability:</b></p> <ul style="list-style-type: none"> <li>• 3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 3.5 Collecting, analyzing and interpreting the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Condition for participation in optional education: Propedeuse (propedeutic exam) achieved.</p> <p>Vocational training internship with a satisfactory completion.</p>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No

<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Big Data & AI Fundamentals	1922BDAIFA
<b>Assessment objectives/criteria</b>	The student can demonstrate and apply the knowledge and skills in the field of Big Data & AI (big Data & AI Fundamentals) theory.	
<b>Details of assessments</b>	Schriftelijk without test session	<i>Other method (A) / assessment</i> Assessment (in the form of a final presentation).
<b>Permitted Aids</b>	PC, internet, papers.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Computer Vision 1 [ 1922CVIS1Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Computer Vision 1	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Computer Vision 1 [ 1922CVIS1A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	The student is able to: <ul style="list-style-type: none"> <li>Analyze image or video data using a computer vision model, library or technique;</li> </ul>
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<b>Learning outcomes</b>	<p><b><u>Realize:</u></b></p> <ul style="list-style-type: none"> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul> <p><b><u>Investigative ability:</u></b></p> <ul style="list-style-type: none"> <li>3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>3.5 Collecting, analyzing and interpreting the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Computer Vision 1	1922CVIS1A
<b>Assessment objectives/criteria</b>	The student can demonstrate and apply the knowledge and skills in the field of Computer Vision on a basic level (image processing, simple object detection).	
<b>Details of assessments</b>	Schriftelijk with test session	<i>Written exam (S)</i> All skills and knowledge will be tested during a computer exam (open book).
<b>Permitted Aids</b>	PC (own laptop), internet, (computer vision) software, papers.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Data Mining & Statistics [ 1922DMSTAZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Data Mining &	3

		Statistics	
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Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Data Mining & Statistics [ 1922DMSTAA ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	The student is introduced to techniques and best practices in the field of Data Mining.
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>3.12. Analyzing data to train the ML-system. (SW)</li> </ul> <p><b>Investigative ability:</b></p> <ul style="list-style-type: none"> <li>3.6 Derive substantiated conclusions and recommendations from research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Condition for participation in optional education:</p> <ul style="list-style-type: none"> <li>Propedeeuse achieved.</li> <li>Placement with a satisfactory completion.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Data Mining & Statistics	1922DMSTAA
<b>Assessment objectives/criteria</b>	<p>The student can:</p> <ul style="list-style-type: none"> <li>Compile a data set based on raw (unstructured) data using a tool and / or algorithm;</li> <li>Perform a regression analysis on a data set or a combined data set using a tool and / or algorithm;</li> <li>Perform a classification on a data set or a combined data set using a tool and / or algorithm;</li> <li>Perform a clustering on a data set or a combined data set using a tool and / or algorithm;</li> <li>Perform a recommendation on a data set or a combined data set using a tool and / or algorithm;</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<p>SZ (Written without test session)</p> <p>The student builds a portfolio about the knowledge and skills gained in the field of Data Mining. This consists of four assignments:</p> <ul style="list-style-type: none"> <li>Regression;</li> </ul>



		<ul style="list-style-type: none"> <li>• Classification;</li> <li>• Clustering;</li> <li>• Recommendation.</li> </ul> <p>Details of each assignment will be provided on Moodle. Each assignment must be a pass, when all are passed the average grade will be the module grade.</p>
<b>Permitted Aids</b>	PC, internet, Data Mining / Data Science Tools (e.g.. Python RapidMiner, Splunk, etc.)	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Python & Tools [ 1922PYTHTZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Python & Tools	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Python & Tools [ 1922PYTHTA ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	<p>The student is able to:</p> <p><b>Python</b></p> <ul style="list-style-type: none"> <li>• Use Python and other tools to tackle data (science) problems.</li> </ul> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• For the Tools part students will give a workshop to each other. In this workshop they will demonstrate how a particular tool (software application or programming language) can be used for datamining. This tool can be any tool except Python. This part will be assessed with a pass/fail.</li> </ul>
<b>Learning outcomes</b>	<p><b>Realize:</b></p> <ul style="list-style-type: none"> <li>• 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul> <p><b>Investigative ability:</b></p>

	<ul style="list-style-type: none"> <li>• 3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 3.5 Collecting, analyzing and interpreting the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Python & Tools	1922PYHTA
<b>Assessment objectives/criteria</b>	<p>The student can demonstrate and apply the knowledge and skills using Python, R or similar data science tools.</p> <p>To give students a head start Python as a separate course has been added. In this course Python &amp; Tools for Data Science, we will also talk about other tools, such as R, RapidMiner, SPSS, etc.</p>	
<b>Details of assessments</b>	Schriftelijk without test session	<i>Other method (A) / assessment</i> The student gives a workshop and is actively participating in the workshops of other groups.
<b>Permitted Aids</b>	PC, internet, papers, VM, Anaconda, R, RapidMiner, SPSS, data (science) tools.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Research Big Data [ 1922RESBDZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Research Big Data	2

Module name	Weighting factor	Assessment	Required	Number of study
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and code		scale	minimum score	hours
Research Big Data [ 1922RESBDA ]	100%	GRD (1 t/m 100)	55	56
<b>Content of unit of study</b>		<p>The module focuses on the further development of research skills. The emphasis is on formulating good research questions, finding, assessing and using good sources and using an empirical research method to answer these questions. This module is a preparation for the graduation project in which doing research to support the final product is an important part. For this module, you write a paper together with a fellow student on a topic related to your minor. This paper is an elaboration of a well-founded research question which you will answer by means of desk research (e.g. on the basis of literature) and field research. For this paper, in addition to desk research, you base yourself on at least one other empirical research method (field research). For example, you can interview an expert or conduct a survey among your target group. You can also choose another method. Peer review is an important element in this module.</p>		
<b>Learning outcomes</b>		<p><b><u>Professionalisation:</u></b></p> <p><b><u>6.3.1 Self-steering ability:</u></b></p> <ul style="list-style-type: none"> <li>• Can detect, integrate and apply relevant knowledge and insights in new situations;</li> <li>• Takes his own task and role seriously.</li> </ul> <p><b><u>6.3.2 Social communication skills:</u></b></p> <ul style="list-style-type: none"> <li>• Can work together effectively in a team;</li> <li>• Can give and receive feedback;</li> <li>• Expresses effectively orally and in writing in correct, understandable and appropriate Dutch of English.</li> </ul> <p><b><u>6.3.3 Creativity and problem-solving ability:</u></b></p> <ul style="list-style-type: none"> <li>• Comes up with new ideas, approaches or insights;</li> <li>• Comes up with different solutions to a problem.</li> </ul> <p><b><u>Research skills:</u></b></p> <ul style="list-style-type: none"> <li>• 7.3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 7.3.3 Making substantiated choices for research methods and instruments;</li> <li>• 7.3.4 Selecting and using relevant, reliable and current sources to support the research;</li> </ul>		

	<ul style="list-style-type: none"> <li>7.3.5 Collecting, analysing and interpreting the relevant research data;</li> <li>7.3.6 Link substantiated conclusions and recommendations to research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	See admission requirements for the minor (elective education).
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Research Big Data	1922RESBDA
<b>Assessment objectives/criteria</b>	Research is reported in the form of a paper that is assessed on: <ul style="list-style-type: none"> <li>The quality of the research questions and objective</li> <li>The quality of desk research</li> <li>The quality of the field research</li> <li>The quality of the analysis and the conclusion</li> <li>The quality of reporting (language and readability)</li> </ul> Active participation in the peer review process is required.	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: research paper on an IT subject, to be uploaded in GardeWork.
<b>Permitted Aids</b>	Not applicable.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Big Data & AI: PoC [ 1922BDPOCZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Project Big Data & AI: PoC	6

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Proof of Concept Application [	50%	GRD (1 t/m 100)	55	84

1922BDPOCA ]				
Advice Report / Publication [ 1922BDPOCB ]	50%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>During the Big Data &amp; AI semester, the students work in groups on four on a Big Data &amp; AI project. The semester consists of two terms. This (Project Big Data &amp; AI – PoC) is the project of the second term. Every week there is project supervision in which a teacher monitors the planning, the progress and the group process. The students can also ask technical questions about the project during this supervision. Students come up with a SOLUTION for the 'data science / computer vision / speech analysis/text analysis' project.</p>
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>• 2.7 Analysis of available ICT options in the field; (OP)</li> <li>• 3.5 Analysis (quantitative and/or qualitative) of the current and future situation in the area of, for example, policy, strategy, alignment and architecture, while applying the most commonly used methods; (OP)</li> <li>• 3.12 Analyzing data to train the ML-system; (SW)</li> <li>• 4.2 Carry out thorough, theoretically supported research into technological (inter-organisational) process innovations (AI, machine &amp; deep learning, digital twins, blockchain, etc.). (OP).</li> </ul> <p><b>To advise:</b></p> <ul style="list-style-type: none"> <li>• 2.5 Provide advice on new ICT possibilities, including package selection and advice. (OP)</li> </ul> <p><b>Realize:</b></p> <ul style="list-style-type: none"> <li>• 3.4 Arrange solutions for structured and unstructured data; (OP)</li> <li>• 4.7 Build AI related software. (SW)</li> </ul> <p><b>Professionalize:</b></p> <ul style="list-style-type: none"> <li>• 3.1 Self-steering ability;</li> <li>• 3.2 Social communication skills;</li> <li>• 3.3 Creativity and problem-solving ability;</li> <li>• 3.4 Awareness of social responsibility.</li> </ul> <p><b>Research:</b></p> <ul style="list-style-type: none"> <li>• 3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 3.2 Clear formulation of goal and research questions based on the problem analysis;</li> </ul>

	<ul style="list-style-type: none"> <li>• 3.5 Collecting, analyzing and interpreting the relevant research data;</li> <li>• 3.6 Link substantiated conclusions and recommendations to research results</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Proof of Concept Application	1922BDPOCA
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Discovering, demonstrating and predicting cause-effect changes from a large collection of data (Big Data) using artificial intelligence techniques.</li> <li>• The student can present this in a presentation to the client, also makes a proof-of-concept application to validate the research and describes his findings in an advice report.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p><i>Other method (A) / assessment</i></p> <p>The student delivers the following products in preparation for the next term:</p> <ul style="list-style-type: none"> <li>• D. Proof of Concept Application (50%);</li> </ul> <p><i>The proof-of-concept application or script makes use of the initial cleaned/prepared dataset, the previously trained model, constructed/realized based on the previous TFGD to demonstrate the workings of the algorithm/model. The proof-of-concept application needs to adhere to the minimum requirements of the client company.</i></p>
<b>Permitted Aids</b>	PC, internet, VMware Image.	
<b>Work methods and educational activities</b>	16 Contacthours: Project support / consultancy + Unaccompanied project hours.	
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Yes: Mandatory attendance and active participation applies to all projects (see also Article 27a). The rules may differ per project and are published on Moodle. Insufficient cooperation or opposing in group work can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card). For a more detailed interpretation of the sanctions policy, reference is made to the project manual and the relevant Moodle Course.
<b><u>Module with test</u></b>	Advice Report / Publication	1922BDPOCB
<b>Assessment objectives/criteria</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>• Discovering, demonstrating and predicting cause-effect changes from a large collection of data (Big Data) using artificial intelligence techniques.</li> <li>• The student can present this in a presentation to the client, also makes a proof-of-concept application to validate the research and describes his findings in an advice report.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<p><i>Other method (A) / assessment</i></p> <p>The student delivers the following products:</p> <ul style="list-style-type: none"> <li>• E. Advice Report/Publication (50%);</li> </ul> <p><i>The Advice Report consists of: a List of terms and abbreviations, Summary (max 1 A4), Introduction with research question and sub-questions, Project assignment, Project/research approach, Research findings, Conclusion and recommendations, Literature and source list, Cover page, table of contents, correct use of language and neat layout, and a list of APA references used in a correct manner.</i></p> <p><i>The Advice Report can be replaced by a publication/article in a peer-reviewed scientific journal. The article needs to be</i></p>

		<i>accepted for publication and adheres to the authoring guidelines of the specific journal.</i>
<b>Permitted Aids</b>	PC, internet, VMware Image.	
<b>Work methods and educational activities</b>	16 Contacthours: Project support / consultancy + Unaccompanied project hours.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Yes: Mandatory attendance and active participation applies to all projects (see also Article 27a). The rules may differ per project and are published on Moodle. Insufficient cooperation or opposing in group work can lead to a sanction. With the first sanction the student receives a warning, with the second sanction a yellow card and a third sanction results in disqualification from the project group (red card). For a more detailed interpretation of the sanctions policy, reference is made to the project manual and the relevant Moodle Course.

## Parallel Distributed Processing [ 1922PARDPZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Parallel Distributed Processing	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Parallel Distributed Processing [ 1922PARDPA ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	The student is able to: During this PDP / MLOps course, the student learns how to deploy AI models into production. The student can apply the acquired skills in the
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	three assignments that are assessed with a mark.
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>3.12 Analyzing data to train the ML-system (SW)</li> </ul> <p><b>Realize:</b></p> <ul style="list-style-type: none"> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing framework; (SW)</li> <li>4.7 Build AI related software. (SW)</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>3.10 Designing a data architecture and a model architecture (e.g. training a ML algorithm); including a testing strategy for the data and ML models (SW)</li> </ul> <p><b>Investigative capacity:</b></p> <ul style="list-style-type: none"> <li>3.5 -Collect, analyze and interpret the research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Parallel Distributed Processing	1922PARDPA
<b>Assessment objectives/criteria</b>	The student is able to: <ul style="list-style-type: none"> <li>Deploy an AI model into a production pipeline.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<i>Other method (A) / assessment:</i> <ul style="list-style-type: none"> <li>Series of 3 assignments.</li> </ul>
<b>Permitted Aids</b>	PC, internet, VMware Image	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Computer Vision 2 [ 1922CVIS2Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Computer Vision 2	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Computer Vision 2 [ 1922CVIS2A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	The student is able to: <ul style="list-style-type: none"> <li>Analyze image or video data using a computer vision model, library or technique.</li> </ul>
<b>Learning outcomes</b>	<p><b>Realize:</b></p> <ul style="list-style-type: none"> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul> <p><b>Investigative ability:</b></p> <ul style="list-style-type: none"> <li>3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>3.5 Collecting, analyzing and interpreting the relevant research data.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Computer Vision 2	1922CVIS2A
<b>Assessment objectives/criteria</b>	The student can demonstrate and apply the knowledge and skills in the field of Computer Vision on an advanced level (object recognition and motion detection).	
<b>Details of assessments</b>	Schriftelijk with test session	Exam without written session (SZ) All skills and knowledge will be tested during a series of smaller assignments

<b>Permitted Aids</b>	PC (own laptop), internet, (computer vision) software, papers.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Natural Language Processing [ 1922NLNGPZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Natural Language Processing	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Natural Language Processing [ 1922NLNGPA ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	The student is able to: <ul style="list-style-type: none"> <li>Analyze speech, audio or text using a NLP model, library or technique.</li> </ul>
<b>Learning outcomes</b>	<b>Realize:</b> <ul style="list-style-type: none"> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> <li>4.7 Build AI related software. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved. Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Natural Language Processing	1922NLNGPA
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<b>Assessment objectives/criteria</b>	The student can demonstrate and apply the knowledge and skills in the field of Natural Language Processing on a basic level (detection and recognition of speech / audio [ speech-to-text] AND text-analysis).	
<b>Details of assessments</b>	Schriftelijk without test session	<i>Exam without written session (SZ)</i> All skills and knowledge will be tested during a final assignment.
<b>Permitted Aids</b>	PC (own laptop), internet, (NLP / speech / audio) software, papers.	
<b>Work methods and educational activities</b>	16 Contact hours: Lectures and guest lectures.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Capita Selecta [ 1922CAPSLZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Capita Selecta	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Capita Selecta [ 1922CAPSLA ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>Analyze the scientific status quo [current status in the field] of data science and AI;</li> <li>Reproduce interesting findings of guest speakers;</li> <li>Formulate good / best practices based on scientific insights;</li> </ul>
<b>Learning outcomes</b>	<p><u>Analyze:</u></p> <ul style="list-style-type: none"> <li>3.5 Analysis (quantitative and/or qualitative) of the current and future situation in the area of, for example, policy, strategy, alignment and architecture, while applying the most commonly used methods. (OP)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: Propedeuse (propedeutic exam) achieved.

	Vocational training internship with a satisfactory completion.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Capita Selecta	1922CAPSLA
<b>Assessment objectives/criteria</b>	The student can demonstrate and apply the knowledge and skills that were obtained during guest lectures (masterclasses).	
<b>Details of assessments</b>	Schriftelijk without test session	<i>Other method (A) / assessment</i> A small paper on the insights of the (guest) masterclasses of several data science companies.
<b>Permitted Aids</b>	PC, internet, papers.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Professioneel presenteren [ 1922BDAPPZ ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Professioneel presenteren	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Presenting [ 1922BDAPPA ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	In elective education, the student conducts within a team, research on an IT Trend. On this trend, the team conducts a workshop with an interactive element. In preparation for this lesson, each team writes a Workshop Plan that describes the
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	learning objectives, working methods and planning of the lesson. The lesson itself is assessed according to fixed criteria and constitutes the assessment of this study component.	
<b>Learning outcomes</b>	<p><b><u>Professionalization:</u></b></p> <p><u>6.3.1 Self-directing ability</u></p> <ul style="list-style-type: none"> <li>Recognizes own areas of concern and formulates learning objectives based on feedback and self-reflection;</li> <li>Takes own task and role seriously.</li> </ul> <p><u>6.3.2 Social-communicative competence</u></p> <ul style="list-style-type: none"> <li>Can collaborate effectively in a team;</li> <li>Can communicate effectively with people in different positions;</li> <li>Can listen to and empathise with another person's point of view;</li> <li>Can transfer knowledge, insights and skills to others;</li> <li>Can give and receive feedback;</li> <li>Can be accountable for results achieved and the process.</li> </ul> <p><u>6.3.3 Creativity and problem-solving skills</u></p> <ul style="list-style-type: none"> <li>Comes up with new ideas, approaches or insight.</li> </ul> <p><b><u>Research capability:</u></b></p> <ul style="list-style-type: none"> <li>3.1. Identifying the relevant aspects of a complex problem;</li> <li>3.2. Clearly formulating purpose and research questions based on the problem analysis.</li> </ul>	
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>The following entry requirements apply to enter the elective course:</p> <ul style="list-style-type: none"> <li>The propaedeutic year has been passed;</li> <li>The 3rd year internship has been successfully completed;</li> <li>A minimum of 130 EC has been obtained.</li> </ul>	
<b>Phase of Bachelor's programme</b>	hoofdphase	
<b>Qualitative requirement BSR</b>	No	
<b>Graduation product designation</b>	No	
<b>Sets requirement for the work environment</b>	No	
<b>Professional part</b>	No	
<b>Specific details</b>		
<b><u>Module with test</u></b>	Professional Presenting	1922BDAPPA
<b>Assessment objectives/criteria</b>	<p>Test criteria professional presentation:</p> <ul style="list-style-type: none"> <li>Student is able to transfer knowledge, insights and skills to others, tailored to knowledge level and interest of the target</li> </ul>	

	<p>group;</p> <ul style="list-style-type: none"> <li>• Student is able to transfer research results in the form of a lesson to peers using interactive work formats. In preparation for the lesson, goals are set and a lesson plan is drawn up in which the lesson is planned and structured;</li> <li>• The student is able to formulate goals for the transfer of knowledge and skills and to select the most appropriate work forms to incorporate this in a workshop plan.</li> </ul> <p>The workshop is assessed based on the following criteria:</p> <ul style="list-style-type: none"> <li>• Objective: Is it clear what students want to achieve from the lesson?</li> <li>• Starting situation: Do students probe the starting situation and respond appropriately?</li> <li>• Lesson content: Is the content offered in a structured and interactive way?</li> <li>• Work format(s): Does the work format used match the objective and is it well implemented?</li> <li>• Learning resources: Do the learning tools used match the objective and are they used well?</li> <li>• Completion: Do students complete the lesson appropriately? Do they return to the objective? Does review take place?</li> <li>• Presentation skills: How is voice, speaking pace, body posture, eye contact used?</li> <li>• Interaction: Is active use made of interaction with the audience?</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<p>Students prepare a workshop plan based on the test criteria. The lesson is realised based on the workshop plan. The lesson is evaluated and assessed by students and teachers present</p> <p><b><u>Research didactics</u></b></p> <p>Planning and delivering a lesson on the chosen current ICT trend. The lesson plan is a conditional requirement. Execution of lesson in accordance with requirements (assessment form, see test criteria).</p>
<b>Permitted Aids</b>	Teaching materials, teaching aids.	
<b>Work methods and educational activities</b>	<p>Two lectures (practical) with elaboration and discussion of assignments.</p> <p>In research didactics, a lesson on the ICT topic chosen for research paper is prepared and presented in groups. Two work seminars with feedback moments are scheduled for this. In addition, two lessons of fellow students are attended.</p>	
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Yes for the workshops.
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## Cloud Databases [ 1920CLD01Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Cloud Databases	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Cloud Databases [ 1920CLD01A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	In this unit of study, the student is introduced to database solutions within a cloud environment, and related development and design patterns. The student learns how to set up his database to ensure scalability and resilience.
<b>Learning outcomes</b>	<u>Realisation:</u> 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)
<b>Requirements for participation in units of study (See also article 31a TER)</b>	To be able to start elective education, the following admission requirements apply: 1. The foundation year has been passed; 2. The 3rd year internship has been successfully completed.
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Cloud Databases	1920CLD01A
<b>Assessment objectives/criteria</b>	The student develops a database solution in a cloud environment in the form of an individual assignment, which also requires communication with the database from code. This solution is set up correctly according to the applicable design paradigms.	
<b>Details of assessments</b>	Andere wijze	



	without test session	
<b>Permitted Aids</b>	Not applicable	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Server Side Programming [ 1918MOBL2Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Server Side Programming	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Server Side Programming [ 1918MOBL2A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	This unit of study focuses on the development of a RESTful API in a cloud environment.
<b>Learning outcomes</b>	<b>Realisation:</b> <ul style="list-style-type: none"> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Condition for participation in optional education: <ul style="list-style-type: none"> <li>Propeduse achieved;</li> <li>Vocational training internship with a satisfactory completion.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdphase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Server Side Programming	1918MOBL2A
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<b>Assessment objectives/criteria</b>	The student develops a RESTful API, using tools, frameworks and libraries.	
<b>Details of assessments</b>	Andere wijze without test session	The student develops a RESTful API in a cloud environment by using the tools, frameworks and libraries used in the workshops.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Theory and practice are alternated during the lessons. Each theory block is concluded with an exercise that can be worked on in class. The teacher is present for support. The exercises also form the homework.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Research Cloud 1 [ 1922CLD03Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Research Cloud 1	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Research Cloud 1 [ 1922CLD03A ]	100%	SUS (Voldoende / Onvoldoende)	V	56

<b>Content of unit of study</b>	This module focuses on the research capabilities that play a role in the project assignment. This concerns a group assignment. This term focuses on making a research thesis building plan but also one or more sub-questions will already be worked out. This module can be considered as preparation for independent research in the graduation process.
<b>Learning outcomes</b>	<u>7. Research:</u> <ul style="list-style-type: none"> <li>7.3.1 Identifying the relevant aspects of a complex problem;</li> <li>7.3.2 Clear formulation of purpose and research questions based on the problem analysis;</li> <li>7.3.3 Making substantiated choices of research methods and instruments;</li> <li>7.3.4 Select and use relevant, reliable and current sources to support the research;</li> </ul>

	<ul style="list-style-type: none"> <li>7.3.5 Collect, analyze and interpretation of the relevant research data;</li> <li>7.3.6 Connect substantiated conclusions and recommendations to research results;</li> <li>7.3.7 Critically reflecting on the approach of the research and the context in which it was carried out.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	Requirement for participation in elective education: <ul style="list-style-type: none"> <li>Propedeeuse completed</li> <li>Internship with a satisfactory completion</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Research Cloud 1	1922CLD03A
<b>Assessment objectives/criteria</b>	Documentation will be delivered that will be assessed on: <ol style="list-style-type: none"> <li>1. Quality of the problem analysis, research question and sub questions</li> <li>2. Quality of the research (data gathering and analysis)</li> <li>3. Quality of the report;</li> </ol> An action plan is delivered to which a Go/No go decision is linked.	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: A research building plan supporting the project must be submitted through Gradework
<b>Permitted Aids</b>	Not applicable	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Cloud API [ 1923CLD04Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Project Cloud API	10

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Presentation API model [ 1923CLD04B ]	30%	GRD (1 t/m 100)	55	79
Code review [ 1919CLD04C ]	30%	GRD (1 t/m 100)	55	79
Code assessment [ 1916CLD04D ]	40%	GRD (1 t/m 100)	55	108
Presentation final product [ 1916CLD04E ]	0%	SUS (Voldoende / Onvoldoende)	V	14

<b>Content of unit of study</b>	<ul style="list-style-type: none"> <li>• The student goes through the entire process of developing a cloud-based RESTful API in groups, whereby the application stack makes use of an SQL / NoSQL database environment;</li> <li>• The student develops a proof of concept website or other client that demonstrates correct functioning of the developed API;</li> <li>• The student demonstrates the scalability of the API by means of a well-designed load testing environment with which relevant information can be gathered regarding the scalability of the developed API;</li> <li>• The student demonstrates that a complete software release cycle (development, staging, production) from the source code to the production environment can be fully executed;</li> <li>• The student demonstrates that the environment he has developed is manageable;</li> <li>• The aim is to work as much as possible with clients from outside the study program.</li> </ul>
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>• 3.4 Analysis of the consequences of a (strategic) change of direction on organisational processes and their information provision; (OP)</li> <li>• 3.8 Analysis of trends on the area of infrastructures and translating this into desired or necessary developments in company infrastructure; (IS)</li> <li>• 3.10 Carry out a requirement analysis for a software system with various stakeholders in a context of existing systems; (SW)</li> <li>• 3.11 Define acceptance criteria based on quality properties and a risk analysis carried out with, among others, attention for security aspect. (SW)</li> </ul> <p><b><u>Realisation:</u></b></p>

		<ul style="list-style-type: none"> <li>• 3.5 Design components of an enterprise infrastructure while respecting all the requirements in a private, public or hybrid cloud environment; (IS)</li> <li>• 3.6 Compile components of an environment in which the quality of a safe service provision is monitored centrally; (IS)</li> <li>• 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks; (SW)</li> <li>• 3.9 Application of test automation in carrying out tests. (SW)</li> </ul> <p><b><u>Manage &amp; Control:</u></b></p> <ul style="list-style-type: none"> <li>• 3.8 Carry out configuration, change and release management in conjunction with infrastructure management; (SW)</li> <li>• 3.9 Organise a development environment with automated build and test infrastructure; (SW)</li> <li>• 3.10 Set up and make use of: <ul style="list-style-type: none"> <li>- version management,</li> <li>- release management,</li> <li>- teamwork support,</li> <li>- automated testing for hard- and software systems. (HW)</li> </ul> </li> </ul> <p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Self-steering ability;</li> <li>• 3.2 Social communication skills;</li> <li>• 3.3 Creativity and problem-solving ability;</li> <li>• 3.4 Awareness of social responsibility.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>		<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• 1. The foundation year has been passed;</li> <li>• 2. The 3rd year internship has been successfully completed.</li> </ul>
<b>Phase of Bachelor's programme</b>		hoofdfase
<b>Qualitative requirement BSR</b>		No
<b>Graduation product designation</b>		No
<b>Sets requirement for the work environment</b>		No
<b>Professional part</b>		No
<b>Specific details</b>		
<b><u>Module with test</u></b>	Presentation API model	1923CLD04B
<b>Assessment objectives/criteria</b>	The presentation will be assessed based on the following criteria:	

	<ul style="list-style-type: none"> <li>• The student can provide convincing insight that the application architecture is fitting for the problem.</li> <li>• The student can provide convincing insight in the data storage design, and has chosen appropriate storage solutions for the various data storage needs within the application.</li> <li>• The student can provide convincing insight that the API to be developed is a suitable solution for the client's problem;</li> <li>• The student makes clear how the API to be developed will be designed;</li> <li>• The design concepts associated with RESTful APIs have been used correctly.</li> </ul>	
<b>Details of assessments</b>	Mondeling with test session	The student gives a visually supported presentation of his API design.
<b>Permitted Aids</b>	PC, required software.	
<b>Work methods and educational activities</b>	During the fortnightly project supervision, the student can ask questions regarding problems that arise during the design and / or implementation of various functionalities that are relevant to his project.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Code review	1919CLD04C
<b>Assessment objectives/criteria</b>	The documentation, code, and tests will be assessed for usability and completeness. The client's goal must be correctly and appropriately resolved from a server perspective by means of a serverless cloud solution. This solution must be adequately tested by means of automated tests.	
<b>Details of assessments</b>	Andere wijze without test session	Cesuur: 5.5
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>	During the bi-weekly project supervision, the student can ask questions regarding problems that arise during the design and / or implementation of various functionalities that are relevant to his project.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Code assessment	1916CLD04D
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>• The student can demonstrate that he has made a relevant contribution to the project by indicating which parts he has developed himself;</li> </ul>	

	<ul style="list-style-type: none"> <li>• The student can demonstrate that he has actually developed the above-mentioned parts himself by explaining how they work and answering questions about them;</li> <li>• The student can explain and substantiate how he came to the choice of certain programming solutions;</li> <li>• The student can explain how the code developed by him interacts with other components;</li> <li>• The student can add clear comments where it makes sense to comment on code;</li> <li>• The student can give examples of programming solutions that have been discussed in the team, and broadly state what the considerations and / or problems were;</li> <li>• The student can conform to an agreed coding standard.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	During the assessment, the student demonstrates his / her developed part of the application and answers questions about it. Cesuur: 5.5
<b>Permitted Aids</b>	PC, required software.	
<b>Work methods and educational activities</b>	During the fortnightly project supervision, the student can ask questions regarding problems that arise during the design and / or implementation of various functionalities that are relevant to his project.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Presentation final product	1916CLD04E
<b>Assessment objectives/criteria</b>	The presentation will be judged according to the following criteria: <ul style="list-style-type: none"> <li>• Skills;</li> <li>• Oral communication;</li> <li>• Accountability.</li> </ul>	
<b>Details of assessments</b>	Mondeling with test session	The student can justify and explain the delivered documents orally.
<b>Permitted Aids</b>	PC, required software	
<b>Work methods and educational activities</b>	During the bi-weekly project supervision, the student can ask questions regarding problems that arise during the design and / or implementation of various functionalities that are relevant to his project.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance</b>	Nee	

## Cloud Infrastructure [ 1922CLD05Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 2	Cloud Infrastructure	5

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Cloud Infrastructure [ 1922CLD05A ]	100%	GRD (1 t/m 100)	55	140

Content of unit of study	Intro Cloud Infrastructure, microservices and container orchestration.
<p><b>Learning outcomes</b></p>	<p><b><u>Manage &amp; Control:</u></b></p> <ul style="list-style-type: none"> <li>• 3.7 Record the specifications of a proactive management environment of a public, hybrid or private cloud infrastructure; (IS)</li> <li>• 3.8 Carry out configuration, change and release management in conjunction with infrastructure management; (SW)</li> <li>• 3.9 Organise a development environment with automated build and test infrastructure; (SW)</li> <li>• 3.10 Set up and make use of: <ul style="list-style-type: none"> <li>- version management,</li> <li>- release management,</li> <li>- teamwork support,</li> <li>- automated testing for hard- and software systems. (HW)</li> </ul> </li> </ul> <p><b><u>Realization:</u></b></p> <ul style="list-style-type: none"> <li>• 3.5 Design components of an enterprise infrastructure while respecting all the requirements in a private, public or hybrid cloud environment; (IS)</li> <li>• 3.6 Compile components of an environment in which the quality of a safe service provision is monitored centrally; (IS)</li> <li>• 3.7 Compile and carry out a pilot/migration trajectory that includes transfer to management; (IS)</li> <li>• 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul>



<b>Requirements for participation in units of study (See also article 31a TER)</b>	
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Cloud Infrastructure	1922CLD05A
<b>Assessment objectives/criteria</b>		
<b>Details of assessments</b>	Andere wijze without test session	
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Dev/Ops and SRE [ 1922CLD06Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination component</b>	<b>Study load in credits</b>
4	blok 2	Dev/Ops and SRE	2

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
Dev/Ops and SRE [ 1922CLD06A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	Deployment and distributing of apps in containerized environment. Scaling, Trouble shooting and performance monitoring, observability.
<b>Learning outcomes</b>	<b><u>Manage &amp; Control:</u></b> <ul style="list-style-type: none"> <li>3.7 Record the specifications of a proactive management environment of a public, hybrid or private cloud infrastructure; (IS)</li> <li>3.8 Carry out configuration, change and release management in conjunction with</li> </ul>

	<p>infrastructure management; (SW)</p> <ul style="list-style-type: none"> <li>• 3.9 Organize a development environment with automated build and test infrastructure; (SW)</li> <li>• 3.10 Set up and make use of: <ul style="list-style-type: none"> <li>- version management,</li> <li>- release management,</li> <li>- teamwork support,</li> <li>- automated testing for hard- and software systems. (HW)</li> </ul> </li> </ul> <p><b>Realization:</b></p> <ul style="list-style-type: none"> <li>• 3.5 Design components of an enterprise infrastructure while respecting all the requirements in a private, public or hybrid cloud environment; (IS)</li> <li>• 3.6 Compile components of an environment in which the quality of a safe service provision is monitored centrally; (IS)</li> <li>• 3.7 Compile and carry out a pilot/migration trajectory that includes transfer to management; (IS)</li> <li>• 3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Dev/Ops and SRE	1922CLD06A
<b>Assessment objectives/criteria</b>		
<b>Details of assessments</b>	Andere wijze without test session	
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
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## Microservices Architecture [ 1922CLD07Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 2	Microservices Architecture	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Microservices Architecture [ 1922CLD07A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	Deepdive" container/microservice architecture: REST architecture for microservices, API gateway, BFF, RPC, Queuing, caching and Datastores.
<b>Learning outcomes</b>	<p><b>Analysis:</b></p> <ul style="list-style-type: none"> <li>3.8 Analysis of trends on the area of infrastructures and translating this into desired or necessary developments in companies.</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>3.6 Design components of an enterprise infrastructure while respecting all the requirements in a private, public or hybrid cloud environment. (IS)</li> </ul> <p><b>Realization:</b></p> <ul style="list-style-type: none"> <li>3.5 Design components of an enterprise infrastructure while respecting all the requirements in a private, public or hybrid cloud environment; (IS)</li> <li>3.6 Compile components of an environment in which the quality of a safe service provision is monitored centrally; (IS)</li> <li>3.7 Compile and carry out a pilot/migration trajectory that includes transfer to management; (IS)</li> <li>3.8 Build and make available a scalable software system that correlates with existing systems, perhaps in the cloud, according to the designed architecture while using existing frameworks. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	
<b>Phase of Bachelor's programme</b>	hoofdfase

<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Microservices Architecture	1922CLD07A
<b>Assessment objectives/criteria</b>		
<b>Details of assessments</b>	Andere wijze without test session	
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Research Cloud 2 [ 1922CLD09Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination component</b>	<b>Study load in credits</b>
4	blok 2	Research Cloud 2	2

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
Research Cloud 2 [ 1922CLD09A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>During this period research is carried out within the framework of the project. Whereas in period 4.1 the emphasis was on making a research design, it is now largely about collecting and analyzing data: systematic answers are sought to sub-questions which lead to a conclusion and recommendations.</p> <p>This part can be considered as a focused preparation for the individual research in the graduation phase.</p>
<b>Learning outcomes</b>	<p><u>6. Professionalisation:</u></p> <ul style="list-style-type: none"> <li>• 6.3.2 Social communicative ability;</li> <li>• 6.3.3 Creativity and problem solving skills;</li> <li>• 6.3.4 Awareness of social responsibility.</li> </ul>

	<u>7. Research skills:</u> <ul style="list-style-type: none"> <li>• 7.3.1 Map out the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clearly formulate the goal and research questions based on the problem analysis;</li> <li>• 7.3.3 Make substantiated choices concerning research methods and instruments;</li> <li>• 7.3.4 Select and use relevant, reliable and up-to-date sources to support the research;</li> <li>• 7.3.5 Collect, analyse and interpret the relevant research data;</li> <li>• 7.3.6 Derive substantiated conclusions and recommendations from research results.</li> <li>• 7.3.7 Critically reflect on the research approach and the context in which it was conducted.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<ul style="list-style-type: none"> <li>• Propedeuse completed.</li> <li>• Internship completed satisfactory.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Research Cloud 2	1922CLD09A
<b>Assessment objectives/criteria</b>	A report is submitted that is assessed on: <ol style="list-style-type: none"> <li>1. Quality of the problem analysis, exploration and research questions</li> <li>2. Quality of the research (methodologies, data gathering, data analysis)</li> <li>3. Quality of the conclusions and recommendations</li> <li>4. Quality of the reporting (text and language)</li> <li>5. Quality of the evaluation and reflection (on research process and collaboration) and competency report</li> </ol>	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: A research thesis supporting the project must be submitted through Gradework
<b>Permitted Aids</b>	Not applicable	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

# Mobile Platforms [ 1918MOBL1Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Mobile Platforms	6

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Apple [ 1918MOBL1A ]	50%	GRD (1 t/m 100)	55	84
Android [ 1918MOBL1B ]	50%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>In these 3 workshops, students learn to develop an application for the following 2 mobile platforms:</p> <ul style="list-style-type: none"> <li>• iOS;</li> <li>• Android.</li> </ul>
<b>Learning outcomes</b>	<p><b>Design:</b></p> <ul style="list-style-type: none"> <li>• 3.1. Designing ICT and / or digital media products from a self-designed (innovative) functionality, interaction form, style and / or service, including. User experience, usability testing and innovative technology (GI)</li> </ul> <p><b>Realization:</b></p> <ul style="list-style-type: none"> <li>• 3.1 Realization and testing of dynamic ICT and / or digital media products using innovative technologies (GI);</li> <li>• 3.4. Building and making available a software system that connects to existing systems, according to the designed architecture using existing frameworks (SW).</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ol style="list-style-type: none"> <li>1. The foundation year has been passed;</li> <li>2. The 3rd year internship has been successfully completed.</li> </ol>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Apple	1918MOBL1A
<b>Assessment objectives/criteria</b>	<p>The student:</p> <ul style="list-style-type: none"> <li>• Shows knowledge of iOS platform specific features;</li> <li>• Can design an interface based on functional requirements;</li> <li>• Shows knowledge of the lifecycle of an iOS app;</li> <li>• Can apply data binding to link data to user interface elements;</li> <li>• Can use Swift to develop iOS apps;</li> <li>• Can use (secure) local storage;</li> <li>• Can communicate with a backend server;</li> <li>• Can integrate 3rd party libraries / code into his project;</li> <li>• Can make use of programming concepts used in the market in relation to (mobile) application development, including use of MVC.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	The student individually creates a mobile application based on an assignment. This application is assessed by the teacher.
<b>Permitted Aids</b>	Permitted AIDS PC, software for creating the application and internet.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Android	1918MOBL1B
<b>Assessment objectives/criteria</b>	<p>The student:</p> <ul style="list-style-type: none"> <li>• Shows knowledge of Android platform specific features;</li> <li>• Can design an interface based on functional requirements;</li> <li>• Shows knowledge of the life cycle of an Android app;</li> <li>• Can apply data binding to link data to user interface elements;</li> <li>• Can use Kotlin to develop Android apps;</li> <li>• Can use (secure) local storage;</li> <li>• Can communicate with a backend server;</li> <li>• Can integrate 3rd party libraries / code into his project;</li> <li>• Can make use of programming concepts used in the market in relation to (mobile) application development, including use of MVC.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	The student individually creates a mobile application based on an assignment. This application is assessed by the teacher.

<b>Permitted Aids</b>	PC, software for creating the application and internet.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Mobile User Interface Design [ 1920MOBL3Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 1	Mobile User Interface Design	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Mobile User Interface Design [ 1920MOBL3A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	In this workshop, students learn to create an interactive click model with Adobe XD.
<b>Learning outcomes</b>	<p><u>Design:</u></p> <ul style="list-style-type: none"> <li>3.1 Designing ICT and / or digital media products from a self-designed (innovative) functionality, form of interaction, style and / or service, including user experience, usability testing and innovative technology (GI).</li> </ul> <p><u>Analyze:</u></p> <ul style="list-style-type: none"> <li>3.1 Mapping trends in communication and design repertoire of ICT and / or digital media products (GI);</li> <li>3.6 Perform a requirement analysis for a multi-stakeholder software system in a context of existing systems (SW).</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ol style="list-style-type: none"> <li>The foundation year has been passed;</li> <li>The 3rd year internship has been successfully completed;</li> </ol>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No



<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Mobile User Interface Design	1920MOBL3A
<b>Assessment objectives/criteria</b>	<p>In this workshop, students make a copy of a Mobile app in Adobe XD. The aim is to train skills with this tool so that simple concepts can be quickly modeled for testing.</p> <p>There is a choice of different applications.</p> <p>The assessment method of the created app:</p> <p>Functionality (40%),</p> <p>Relevant and essential functionality is "testable" in the prototype</p> <p>Design (30%),</p> <p>The design is graphically an exact copy of the original example.</p> <p>Detail (15%),</p> <p>"Secondary" functionality (eg settings) has been elaborated in detail.</p> <p>User XD (15%)</p> <p>The functionality of the Adobe XD product has been widely used. Symbols, repeat grids, triggers and animations have been used.</p> <p>(not only screen dumps are connected!)</p>	
<b>Details of assessments</b>	Andere wijze without test session	<p>The students make a click model based on a case study. With this click model, the students write and generate the requested documentation.</p> <p>In the last workshop, the students present the click model. Documentation and click model are assessed for a grade.</p>
<b>Permitted Aids</b>	PC, software for making a click model and internet.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Application Design [ 1920MOBL4Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination component</b>	<b>Study load in credits</b>
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4	blok 1	Project Application Design	5
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Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Project Application Design [ 1920MOBL4A ]	100%	GRD (1 t/m 100)	55	140

<b>Content of unit of study</b>	<p>The project group, consisting of three or four students, has a real client for the project. The project group will deliver the following components:</p> <ul style="list-style-type: none"> <li>• Digital click model</li> <li>• Design document (including scenarios, use cases, elaboration of click model, user interface design, technical specifications, non-functional specifications)</li> </ul>
<b>Learning outcomes</b>	<p><u>Analyze:</u></p> <ul style="list-style-type: none"> <li>• 3.1. Mapping trends in communication and design repertoire of ICT and / or digital media products (GI);</li> <li>• 3.2. Preparing an analysis report (target group, objective, context, information and communication need, visualization, usability and Analyzing), and relating this to trends in ICT and / or digital media products (GI);</li> <li>• 3.4. Researching trends in the field of ICT infrastructure based on (international) technological, economic and social developments and innovations (IS);</li> <li>• 3.5 Perform a requirements analysis for a business infrastructure to identify functional and non-functional requirements (IS);</li> <li>• 3.6. Perform a requirement analysis for a software system with different stakeholders in a context of existing systems (SW).</li> </ul> <p><u>Design:</u></p> <ul style="list-style-type: none"> <li>• 3.1. Designing ICT and / or digital media products from a self-designed (innovative) functional, form of interaction, style and / or service, including user experience, usability tests and innovative technology (GI);</li> <li>• 3.3. Establish a software architecture for a software system, consisting of already existing and new systems, considering quality features and stakeholders (SW)</li> <li>• </li> </ul> <p><u>Realize :</u></p>

	<ul style="list-style-type: none"> <li>• 3.1 Prepare a software architecture for a software system, consisting of existing and new systems, considering quality features and stakeholders (SW).</li> </ul> <p><u>6. Professionalizing:</u></p> <ul style="list-style-type: none"> <li>• 6.3.2 Social communicative ability;</li> <li>• 6.3.3 Creativity and problem-solving ability;</li> <li>• 6.3.4 Awareness of social responsibility.</li> </ul> <p><u>7. Research skills:</u></p> <ul style="list-style-type: none"> <li>• 7.3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clear formulation of purpose and research questions based on the problem analysis;</li> <li>• 7.3.3 Make well-founded choices of research methods and instruments;</li> <li>• 7.3.4 Select and use relevant, reliable and current sources to support the research;</li> <li>• 7.3.5 To Collect, analyze and interpretative the relevant research data;</li> <li>• 7.3.6 Connect substantiated conclusions and recommendations to research results;</li> <li>• 7.3.7 Reflect critically on the approach to the research and the context in which it was conducted.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• 1. The foundation year has been passed;</li> <li>• 2. The 3<sup>rd</sup> year internship has been successfully completed;</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Project Application Design	1920MOBL4A
<b>Assessment objectives/criteria</b>	<p>Project Application Design</p> <p><u>Visual Design:</u></p> <ul style="list-style-type: none"> <li>• The house style (brand, identity) of the client been correctly applied (style guide) in the design. If the house style has been applied in a different way within the design, the student must be able to substantiate his actions;</li> <li>• Content (texts) can be read optimally due to good alignment, attention to the line, length of the line (max. 12</li> </ul>	

	<p>words on a line), clear color contrast from text color to background color;</p> <ul style="list-style-type: none"> <li>• No unnecessary white space, all parts are logically connected and form a whole;</li> <li>• The images must fit the application and the target group. Icons or buttons must match their function and therefore clearly recognizable as his;</li> <li>• Shaped functionalities are applied consistently.</li> </ul> <p><u>Click model:</u></p> <ul style="list-style-type: none"> <li>• Flow diagram with the correct icons;</li> <li>• Flow diagram is consistent with the click model;</li> <li>• Flow diagram is linked to the click model;</li> <li>• Use of Dynamic Panels (creativity is assessed);</li> <li>• Use of Masters;</li> <li>• Click models has no dead-ends;</li> <li>• Click model has clearly described elements;</li> <li>• Click model has Splash screen;</li> <li>• Click model has Home screen icon;</li> <li>• Feedback User feedback - Each click gives feedback to the user (by means of a pop-up, color change, upcoming screen, text, etc.);</li> <li>• Click model for iOS, Android and Windows Phone uses platform related Widgets;</li> <li>• Click model for iOS, Android and Windows Phone adheres to the platform Interface Guidelines;</li> <li>• Minimum: Correct resolution;</li> <li>• Minimal: Correct use of the UI elements;</li> <li>• Documentation has everything labeled;</li> <li>• No spelling mistakes in documentation.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p>The project group, consisting of three or four students, has a real client for the project. The project group will deliver the following components:</p> <ul style="list-style-type: none"> <li>• A digital click model, functional and representative of the chosen solution direction;</li> </ul> <p>Design document (including scenarios, use cases, elaboration of click model, user interface design, technical specifications, non-functional specifications)</p> <p>The Click model is presented to the client at the end of the teaching period.</p>
<b>Permitted Aids</b>		

<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	

## Research Mobile 1 [ 1922MOBL8Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination component</b>	<b>Study load in credits</b>
4	blok 1	Research Mobile 1	2

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
Research Mobile 1 [ 1922MOBL8A ]	100%	SUS (Voldoende / Onvoldoende)	V	56

<b>Content of unit of study</b>	This module focuses on the research capabilities that play a role in the project assignment. This concerns a group assignment. This term focuses on making a research thesis building plan but also one or more sub-questions will already be worked out. This module can be considered as preparation for independent research in the graduation process.
<b>Learning outcomes</b>	<u>7. Research skills:</u> <ul style="list-style-type: none"> <li>• 7.3.1 Identifying the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clear formulation of purpose and research questions based on the problem analysis;</li> <li>• 7.3.3 Making well-founded choices of research methods and instruments;</li> <li>• 7.3.4 Select and use relevant, reliable and current sources to support the research;</li> <li>• 7.3.5 Collecting, analyzing and interpreting the relevant research data;</li> <li>• 7.3.6 Connect substantiated conclusions and recommendations to research results;</li> <li>• 7.3.7 Reflect critically on the approach to the research and the context in which it was conducted.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• 1. The foundation year has been passed;</li> </ul>

	<ul style="list-style-type: none"> <li>2. The 3rd year internship has been successfully completed.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Research Mobile 1	1922MOBL8A
<b>Assessment objectives/criteria</b>	Documentation will be provided that will be assessed on: <ol style="list-style-type: none"> <li>1. Quality of the problem analysis, research question and sub questions</li> <li>2. Quality of the research (data gathering and analysis)</li> <li>3. Quality of the report;</li> </ol> Before the document is assessed, halfway through the period, an action plan is delivered to which a Go/No go decision is linked.	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: A research building plan supporting the project must be submitted through Gradework
<b>Permitted Aids</b>	Not applicable	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Research Mobile 2 [ 1920MOBL6Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 2	Research Mobile 2	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Research Mobile 2 [ 1920MOBL6A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	In this period, work will continue on the research launched in period 1, which will take place within the context of the Mobile Applications project,
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	<p>which is now mainly concerned with carrying out: searching systematically for answers to sub-questions to arrive at a conclusion and recommendations.</p> <p>This part can be considered as a focused preparation for the independent research in the graduation process.</p>	
<b>Learning outcomes</b>	<p><u>6. Professionalisation</u></p> <ul style="list-style-type: none"> <li>• Social communicative ability;</li> <li>• 6.3.3 Creativity and problem-solving skills;</li> <li>• 6.3.4 Awareness of social responsibility.</li> </ul> <p><u>7. Research skills:</u></p> <ul style="list-style-type: none"> <li>• 7.3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clear formulation of purpose and research questions based on the problem analysis.</li> <li>• 7.3.3 Making well-founded choices of research methods and instruments;</li> <li>• 7.3.4 Select and use relevant, reliable and current sources to support the research;</li> <li>• 7.3.5 Collection, analysis and interpretation of the relevant research data;</li> <li>• 7.3.6 Connect substantiated conclusions and recommendations to research results;</li> <li>• 7.3.7 Reflect critically on the approach to the research and the context in which it was conducted.</li> </ul>	
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• 1. Propedeuse completed;</li> <li>• 2. The 3<sup>rd</sup> year internship has been successfully completed.</li> </ul>	
<b>Phase of Bachelor's programme</b>	hoofdfase	
<b>Qualitative requirement BSR</b>	No	
<b>Graduation product designation</b>	No	
<b>Sets requirement for the work environment</b>	No	
<b>Professional part</b>	No	
<b>Specific details</b>		
<b>Module with test</b>	Research Mobile 2	1920MOBL6A
<b>Assessment objectives/criteria</b>	<p>A report will be delivered that will be assessed on:</p> <ol style="list-style-type: none"> <li>1. Quality of the problem analysis, exploration and research questions</li> <li>2. Quality of the research (methodologies, data gathering, data analysis)</li> <li>3. Quality of the conclusions and recommendations</li> </ol>	

	4. Quality of the reporting (text and language) 5. Quality of the evaluation and reflection (on research process and collaboration) and competency report	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: A research thesis supporting the project must be submitted through Gradework
<b>Permitted Aids</b>	Not applicable	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Mobile Application [ 1922MOBL7Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 2	Project Mobile Application	10

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Mobile app bèta version [ 1915MOBL7A ]	40%	GRD (1 t/m 100)	55	90
Mobile App Development [ 1915MOBL7B ]	60%	GRD (1 t/m 100)	55	152
Presentation Mobile App [ 1915MOBL7C ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	<p>The project group, consisting of three or four students, has a real client for the project. The project group will deliver the following components:</p> <ul style="list-style-type: none"> <li>Working App (individual assessment);</li> <li>Presentation.</li> </ul>
<b>Learning outcomes</b>	<p><u>Analyze:</u></p> <ul style="list-style-type: none"> <li>3.9. Describe security aspects of computer systems that are linked to or via (public) networks (SW).</li> </ul> <p><u>Design:</u></p>



- 3.1. Designing ICT and / or digital media products from a self-designed (innovative) functionality, interaction form, style and / or service, including user experience, usability testing and innovative technology (GI);
- 3.3. Prepare a software architecture for a software system, consisting of existing and new systems, considering quality features and stakeholders (SW).

#### Realize:

- 3.1. Realization and testing of dynamic ICT and / or digital media products using innovative technologies (GI);
- 3.4. Building and making available a software system that connects to existing systems, according to the designed architecture using existing frameworks (SW).

#### Professionalize

##### 6.3.1 Self-steering ability

- Can operate independently, result-oriented and stress-resistant in critical situations;
- Is entrepreneurial, shows initiative and dares to take risks;
- Recognizes own points of attention and formulates learning objectives based on feedback and self-reflection;
- Can plan and organize well, monitors milestones and deadlines, and keeps appointments;
- Is able to detect, integrate and apply relevant knowledge and insights in ever new situations;
- Takes own task and role seriously.

##### 6.3.2 Social communicative ability

- Can work effectively in a team;
- Can communicate effectively with people in different positions;
- Can listen to and put himself in another person's point of view;
- Can transfer knowledge, insights and skills to others;
- Can give and receive feedback.
- Expresses himself orally and in writing effectively in correct, understandable and appropriate Dutch;
- Can account for the results achieved and the process.

##### 6.3.3 Creativity and problem-solving skills

- Takes substantiated decisions based on available information and analysis and comes up with workable solutions;

	<ul style="list-style-type: none"> <li>• Comes with new ideas, approaches or insights;</li> <li>• Comes with different solutions to a problem.</li> </ul> 6.3.4 Awareness of social responsibility <ul style="list-style-type: none"> <li>• Is aware of the importance of ethics and social values for an organization and supports them;</li> <li>• Can deal with diversity (people with different cultures and backgrounds);</li> <li>• Shows respect and takes care of the people and things around them</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	To be able to start elective education, the following admission requirements apply: <ul style="list-style-type: none"> <li>• 1. The foundation year has been passed;</li> <li>• 2. The 3rd year internship has been successfully completed;</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Mobile app bèta version	1915MOBL7A
<b>Assessment objectives/criteria</b>	The application must be functionally almost complete: <ul style="list-style-type: none"> <li>• Has the house style (brand, identity) of the client been correctly applied (style guide) in the design. If the house style has been applied in a different way within the design, the student must be able to substantiate his actions;</li> <li>• Content (texts) can be read optimally by good alignment, attention to the line, length of the line (max. 12 words on a line), clear color contrast from text color to background color;</li> <li>• No unnecessary white space, all parts are connected in a coherent way and together form a whole;</li> <li>• The images must fit the application and the target group. Icons or buttons must match their function and therefore clearly recognizable as his;</li> <li>• Designed functionalities are applied consistently.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	The project group, consisting of three or four students, has a real client for the project. Each project group member is responsible for one of the Mobile Platforms to pre-program the App.

		Assessment moment is week 5 of the relevant teaching period. The pass mark is 55.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Mobile App Development	1915MOBL7B
<b>Assessment objectives/criteria</b>	<p>The application must be functionally completed; Has the house style (brand, identity) of the client been correctly applied (style guide) in the design. If the house style has been applied in a different way within the design, the student must be able to substantiate his actions; Content (texts) can be read optimally by good alignment, attention to the line, length of the line (max. 12 words on a line), clear color contrast from text color to background color; No unnecessary white space, all parts are logically connected to each other and together form a whole; The images must fit the application and the target group. Icons or buttons must match their function and therefore clearly recognizable as the; Shaped functionalities are applied consistently. The student:</p> <ul style="list-style-type: none"> <li>• Shows knowledge of platform specific features;</li> <li>• Can design an interface based on functional requirements;</li> <li>• Shows knowledge of the lifecycle of an app .;</li> <li>• Can apply data binding to link data to user interface elements;</li> <li>• Can use Swift / Java / C # to develop iOS / Android / UWP apps;</li> <li>• Can use (secure) local storage;</li> <li>• Can communicate with a backend server;</li> <li>• Can integrate 3rd party libraries / code into his project;</li> <li>• Can use market-based programming concepts in relation to (mobile) application development, including use of MVC / MVVM.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	The project group, consisting of three or four students, has a real client for the project. Each project group member is responsible for one of the Mobile Platforms to pre-program the App. Assessment moment is week 5 of the relevant teaching

		period. The pass mark is 55.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Presentation Mobile App	1915MOBL7C
<b>Assessment objectives/criteria</b>	<u>Skills</u> <ul style="list-style-type: none"> <li>• Students demonstrate investigative and analytical skills;</li> <li>• Students can explain used concepts, theories, models and tables;</li> <li>• Students can motivate choices regarding content and process;</li> <li>• Students demonstrate vision and ability to make judgments;</li> <li>• Students can place the subject in a broader context;</li> <li>• The presentation has added value.</li> </ul> <u>Oral communication</u> <ul style="list-style-type: none"> <li>• The presentation has a clear structure (opening, core, closing);</li> <li>• Use of aids is effective;</li> <li>• Oral communication is provided:</li> <li>• Well understood;</li> <li>• Good pace;</li> <li>• Eye contact;</li> <li>• Energetic enthusiastic attitude and story tone;</li> <li>• Correct and professional language use;</li> <li>• Students demonstrate persuasion; arguments are substantiated and consistent;</li> <li>• Students have a good interaction with the examiners.</li> </ul>	
<b>Details of assessments</b>	Mondeling with test session	The project group, consisting of three or four students, has a real client for the project. Each project group member is responsible for one of the Mobile Platforms to pre-program the App. Assessment moment is week 5 of the relevant teaching period.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>		

<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	

## Mobile Security [ 1922MOBL5Z ]

Academic year	Term	Name of examination component	Study load in credits
4	blok 2	Mobile Security	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Paper Security [ 1919MOBL5A ]	0%	SUS (Voldoende / Onvoldoende)	V	56
Mobile Security [ 1919MOBL5B ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	The students must learn about communication and security related aspects of mobile application development.
<b>Learning outcomes</b>	<p><u>Analyze:</u></p> <ul style="list-style-type: none"> <li>3.9 Describe security-aspects of computer systems that are linked to or via (public) networks (SW).</li> </ul> <p><u>To advise:</u></p> <ul style="list-style-type: none"> <li>3.4 Advising on the choice of software architecture or software frameworks, in which cost aspects and quality characteristics such as availability, performance, security and scalability play a role (SW).</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>1. The foundation year has been passed;</li> <li>2. The 3rd year internship has been successfully completed;</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Paper Security	1919MOBL5A
<b>Assessment objectives/criteria</b>	<p>The student demonstrates the ability to present the technical operation, impact and solution of a vulnerability of his own choice and to describe it in a report;</p> <p>The student is able to hash and crack his own password with a tool;</p> <p>The student is able to hash and crack his own password with a tool;</p> <p>The student is able to reverse engineer APK and to make a list of code examples of at least 5 security leaks.</p> <p><u>Presentations:</u></p> <ul style="list-style-type: none"> <li>• Students demonstrate investigative and analytical skills;</li> <li>• Students can explain used concepts, theories, models and tables;</li> <li>• Students can motivate choices regarding content and process;</li> <li>• Students demonstrate vision and ability to make judgments</li> <li>• Students can place the subject in a broader context;</li> <li>• The presentation has added oral communication value</li> <li>• The presentation has a clear structure (opening, core, closing);</li> <li>• Use of aids is effective;</li> <li>• Oral communication is provided, well understood, good pace, eye contact, energetic enthusiastic attitude and tone of voice, correct and professional use of language;</li> <li>• Students demonstrate persuasion; arguments are substantiated and consistent;</li> <li>• Students have a good interaction with the examiners.</li> </ul> <p><i>All above elements are part of the grading of this course</i></p>	
<b>Details of assessments</b>	Schriftelijk without test session	Written
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b>Module with test</b>	Mobile Security	1919MOBL5B
<b>Assessment objectives/criteria</b>		
<b>Details of assessments</b>	Schriftelijk with test session	This subject is concluded with a written test that consists partly of MC questions and partly of open questions
<b>Permitted Aids</b>	The student may only use pen and paper for the test.	

<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Software Development [ 1921SOFTDZ ]

Academic year	Term	Name of examination component	Study load in credits
4	semester 1	Software Development	30

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Research Software Development [ 1921SOFTDA ]	50%	GRD (1 t/m 100)	55	400
Presentation Software Development [ 1921SOFTDB ]	0%	SUS (Voldoende / Onvoldoende)	V	40
Code assessment Software Development [ 1921SOFTDC ]	50%	GRD (1 t/m 100)	55	400

<b>Content of unit of study</b>	<p>Within the Software Development module, it is possible for a group of two to five students to bring in their own project focusing on an IT problem. It is possible to carry out an assignment for an external client in the non-profit sector. The complexity of the IT problem should be level 3, and the IT problem should lend itself to doing research.</p> <p>Before starting a project, approval should be obtained from the programme's assessment committee. To this end, the prospective project group submits a form, explaining what the IT problem is, the purpose and result of the project, the research questions to be answered by the project, the technology stack intended to be used, and the phase planning. In addition, all project members individually describe which competences they will acquire with the implementation of the project.</p>
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	<p>The assessment committee evaluates the request. The assessment committee should be able to form an opinion on the complexity and scope of the assignment, and assess whether these justify the chosen number of ECTS. Furthermore, the assessment committee assesses the students' suitability for carrying out this module, considering the high degree of independence and self-motivation required. An approved proposal entitles the project group to project supervision/consultation during the intended term of the project, and (at most) two assessments. Due to overlap with other elective courses, approval may be subject to the condition that the students cannot follow this overlapping elective course.</p> <p>During the implementation of the project, the project group will design and develop a software product for an IT problem. The project group also carries out research related to the IT problem and the development process, and jointly writes a research report about it.</p> <p>After all products have been delivered, they are assessed by an examiner who was not structurally involved as a consultant. The examiner is advised by one of the consultants, who is also present at all assessment moments.</p>
<b>Learning outcomes</b>	All competences at level 3
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Prerequisite for participation in elective courses:</p> <ul style="list-style-type: none"> <li>• Propedeuse obtained.</li> <li>• Vocational training placement completed with a pass.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Research Software Development	1921SOFTDA
<b>Assessment objectives/criteria</b>	<p>The project group will deliver the professional product and a report after the completion of the project. The report is assessed on:</p> <ul style="list-style-type: none"> <li>• Quality of problem analysis, research question and sub-questions;</li> <li>• Quality of theoretical underpinning;</li> </ul>	



	<ul style="list-style-type: none"> <li>• Quality of research (data analysis);</li> <li>• Quality of the professional product;</li> <li>• Quality of conclusion and recommendations;</li> <li>• Quality of reporting (text and language care);</li> <li>• Critical reflection on research process and collaboration and competence report.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Written submission assignment: documentation reporting on research that serves the purpose of the project assignment. This is a group assignment.
<b>Permitted Aids</b>		
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Presentation Software Development	1921SOFTDB
<b>Assessment objectives/criteria</b>	The presentation will be assessed on: <ul style="list-style-type: none"> <li>• Proficiency</li> <li>• Oral communication</li> <li>• Accountability</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Students can orally justify and explain the creation of the professional product and research.
<b>Permitted Aids</b>	N.a.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Code assessment Software Development	1921SOFTDC
<b>Assessment objectives/criteria</b>	For the purpose of the code assessment, the project group delivers the source code of the professional product in the form of one or more Git repositories, on which the group members have committed their work under their own name. The contribution of the individual group members will be assessed according to the following criteria: <ul style="list-style-type: none"> <li>• The student can make a plausible case that they have made a relevant contribution to the project by indicating which</li> </ul>	

	components they have developed themselves; • The student can demonstrate that he has actually developed the above-mentioned components himself by explaining how they work and answering questions about them; • The student can explain and substantiate how he came to the choice of certain programming solutions; • The student can explain how the code he has developed interacts with other components; • The student can clearly add comments where it makes sense to comment on code; • The student can cite examples of programming solutions that have been under discussion in the team, and broadly state what the considerations and/or problems were; • The student can conform to an agreed coding standard.	
<b>Details of assessments</b>	Andere wijze without test session	During the assessment, the student demonstrates his/her developed part of the application and answers questions about it.
<b>Permitted Aids</b>	N.a.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Professional Presenting [ 1922SEC01Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Professional Presenting	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Professional Presenting [ 1922SEC01A ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	In elective education, the student conducts within a team, research on an IT Trend. On this trend, the team conducts a workshop with an interactive element. In preparation for this lesson, each team writes a Workshop Plan that describes the learning objectives, working methods and planning of the lesson. The lesson itself is assessed according to fixed criteria and
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	constitutes the assessment of this study component	
<b>Learning outcomes</b>	<p><b><u>Professionalizing:</u></b></p> <p><b><u>6.3.1 Self-directing ability</u></b></p> <ul style="list-style-type: none"> <li>• Recognizes own areas of concern and formulates learning objectives based on feedback and self-reflection;</li> <li>• Takes own task and role seriously.</li> </ul> <p><b><u>6.3.2 Social-communicative competence</u></b></p> <ul style="list-style-type: none"> <li>• Can collaborate effectively in a team;</li> <li>• Can communicate effectively with people in different positions;</li> <li>• Can listen to and empathise with another person's point of view;</li> <li>• Can transfer knowledge, insights and skills to others;</li> <li>• Can give and receive feedback;</li> <li>• Can be accountable for results achieved and the process.</li> </ul> <p><b><u>6.3.3 Creativity and problem-solving skills</u></b></p> <ul style="list-style-type: none"> <li>• Comes up with new ideas, approaches or insight.</li> </ul> <p><b><u>Research capability:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1. Identifying the relevant aspects of a complex problem;</li> <li>• 3.2. Clearly formulating purpose and research questions based on the problem analysis.</li> </ul>	
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>The following entry requirements apply to enter the elective course:</p> <ul style="list-style-type: none"> <li>• The propaedeutic year has been passed;</li> <li>• The 3rd year internship has been successfully completed;</li> <li>• A minimum of 130 EC has been obtained.</li> </ul>	
<b>Phase of Bachelor's programme</b>	hoofdfase	
<b>Qualitative requirement BSR</b>	No	
<b>Graduation product designation</b>	No	
<b>Sets requirement for the work environment</b>	No	
<b>Professional part</b>	No	
<b>Specific details</b>		
<b><u>Module with test</u></b>	Professional Presenting	1922SEC01A
<b>Assessment objectives/criteria</b>	<p><u>Test criteria professional presentation:</u></p> <ul style="list-style-type: none"> <li>• Student is able to transfer knowledge, insights and skills to others, tailored to knowledge level and interest of target audience;</li> <li>• Student is able to transfer research findings in the form of a lesson to peers using interactive forms of work. In</li> </ul>	

	<p>preparation for the lesson, goals are set and a lesson plan is created in which the lesson is planned and structured;</p> <ul style="list-style-type: none"> <li>• The student is able to formulate goals for the transfer of knowledge and skills and to select the most appropriate work forms to incorporate this in a workshop plan.</li> </ul> <p><u>The workshop is assessed based on the following criteria:</u></p> <ul style="list-style-type: none"> <li>• Objective: Is it clear what the students want to achieve with the lesson?</li> <li>• Starting situation: Do students probe the starting situation and respond appropriately?</li> <li>• Lesson content: Is the content offered in a structured and interactive way?</li> <li>• Workform(s): Does the form of work used match the objective and is it well executed?</li> <li>• Learning Resources: Do the learning tools used match the objective and are they used well?</li> <li>• Completion: Do students complete the lesson appropriately? Do they return to the objective? Does review take place?</li> <li>• Presentation Skills: How is voice, speaking pace, body posture, eye contact used?</li> <li>• Interaction: Is there active use of interaction with the audience?</li> </ul>	
<b>Details of assessments</b>	Schriftelijk without test session	<p>Students prepare a workshop plan based on the test criteria.</p> <ul style="list-style-type: none"> <li>• The lesson is realised based on the workshop plan;</li> <li>• The lesson is evaluated and assessed by students and teachers present.</li> </ul> <p>Research didactics:</p> <ul style="list-style-type: none"> <li>• Planning and delivering a lesson on the chosen current ICT trend;</li> <li>• The lesson plan is a conditional requirement. Execution of lesson in accordance with requirements (assessment form, see test criteria).</li> </ul>
<b>Permitted Aids</b>	Teaching materials, teaching aids.	
<b>Work methods and educational activities</b>	<p>Two lectures (practical) with elaboration and discussion of assignments.</p> <p>In research didactics, a lesson on the ICT topic chosen for research paper is prepared and presented in groups. Two work seminars with feedback moments are scheduled for this.</p> <p>In addition, two lessons of fellow students are attended</p>	
<b>Contact hours for strategies and teaching activities</b>		

<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	Yes for the workshops
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## Penetration Testing [ 1923SEC02Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Penetration Testing	4

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Workshops [ 1923SEC02A ]	100%	GRD (1 t/m 100)	55	112

<b>Content of unit of study</b>	<p>Almost daily news reaches us that the government or companies are dealing with cyber-attacks by hackers. Today's software engineering professionals must understand the basic discipline of building secure software. Not because "it's a good idea", but because the nature of the internet mandates it.</p> <p>This course covers penetration testing. You will learn how the target system works, the weaknesses of this system and how to practically exploit these weaknesses and hack into it.</p>
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>3.11 Define acceptance criteria based on quality properties and a risk analysis carried out with, among others, attention for security aspects. (SW)</li> <li>3.14 Describe security aspects of computer systems that are connected to or via (public) networks. (HW)</li> </ul> <p><b><u>Advise:</u></b></p> <ul style="list-style-type: none"> <li>3.8 Give advice concerning the choice of software architecture or existing software frameworks whereby cost aspects and quality properties such as availability, performance, security and scalability play a role. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<ul style="list-style-type: none"> <li>Propedeuse achieved.</li> <li>Internship completed satisfactory.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No

<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Workshops	1923SEC02A
<b>Assessment objectives/criteria</b>	<ul style="list-style-type: none"> <li>The student is able to present the technical operation, impact and solution of a vulnerability of his choice and to describe it in a report.</li> <li>The student is able to create a webpage in a language of his choice with 2 or more injection vulnerabilities and to make the same pages with the correct fixes.</li> <li>The student is able to reverse engineer an APK and to make a list of code examples of at least 5 security breaches.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Research Paper and Presentation.
<b>Permitted Aids</b>	-	
<b>Work methods and educational activities</b>	Workshops	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Network Security [ 1920SEC03Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Network Security	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Network Security [ 1916SEC03A ]	100%	GRD (1 t/m 100)	55	56
Network Security Practical [ 1916SEC03B ]	0%	SUS (Voldoende / Onvoldoende)	V	28

<b>Content of unit of study</b>	This course provides an introduction to the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network devices to maintain the integrity, confidentiality, and availability of data and devices.
<b>Learning outcomes</b>	<b>Analyse:</b> <ul style="list-style-type: none"> <li>2.9 Analyzing infrastructure-related incidents, problems and security threats.</li> </ul>

	(IS) <b>Design:</b> <ul style="list-style-type: none"> <li>2.8 Compiling a technical design for a medium-sized infrastructure with related protection on the basis of (non) functional requirements. (IS)</li> </ul> <b>Realisation:</b> <ul style="list-style-type: none"> <li>2.8 Setting up a medium-sized infrastructure that meets the requirements with regard to performance, usability, security and compliance. (IS)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<ul style="list-style-type: none"> <li>Propeduse achieved.</li> <li>Internship completed satisfactory.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Network Security	1916SEC03A
<b>Assessment objectives/criteria</b>	Upon completion of this course, students will be able to: <ul style="list-style-type: none"> <li>Describe security threats facing modern network infrastructures;</li> <li>Secure Cisco routers and switches;</li> <li>Describe AAA functionalities and implement AAA on Cisco routers using local router database and server-based ACS or ISE;</li> <li>Mitigate threats to networks using ACLs and stateful firewalls;</li> <li>Describe IPS and IDS to secure networks against evolving attacks;</li> <li>Describe threats to email, web based and endpoints attacks and common Layer 2 attacks;</li> <li>Secure communications to ensure integrity, authenticity and confidentiality;</li> <li>Describe the purpose of VPNs, and implement Remote Access and Site-to-Site VPNS;</li> <li>Secure networks using ASA.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written of online MC test.
<b>Permitted Aids</b>	Pen and scrap paper.	
<b>Work methods and educational activities</b>	Lecture	
<b>Contact hours for strategies</b>		

<b>and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Network Security Practical	1916SEC03B
<b>Assessment objectives/criteria</b>	Upon completion of this course, students will be able to: <ul style="list-style-type: none"> <li>• Create a Basic Technical Security Policy;</li> <li>• Configure Basic Device Settings;</li> <li>• Configure Secure Router Administrative Access;</li> <li>• Configure a Zone-Based Policy Firewall;</li> <li>• Secure Network Switches;</li> <li>• Configure ASA Basic Settings and Firewall;</li> <li>• Configure a DMZ, Static NAT, and ACLs on an ASA;</li> <li>• Configure ASA Clientless SSL VPN Remote Access Using ASDM.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Practical Skills Assignment.
<b>Permitted Aids</b>	Student scan use internet, netacad course and powerpoint slides.	
<b>Work methods and educational activities</b>	Workshops with skills labs.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Information Security [ 1916SEC04Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Information Security	1

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Information Security [ 1916SEC04A ]	100%	GRD (1 t/m 100)	55	28

<b>Content of unit of study</b>	The content of this module includes the material of the Exin module Information Security Foundation. ( based on ISO27002) See also <a href="http://www.exin.nl">www.exin.nl</a> . Companies need to secure their valuable information. This starts with informing and training employees and thereby raising awareness of the
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	<p>risks.</p> <p>The module provides insight into which measures need to be taken.</p> <p>It also deals with legal aspects of information security.</p>
<b>Learning outcomes</b>	<p><b>Advise</b></p> <ul style="list-style-type: none"> <li>• 2.7 Propose methods that improve the information protection of an infrastructure of an SME; (IS)</li> <li>• 3.8 Give advice concerning the choice of software architecture or existing software frameworks whereby cost aspects and quality properties such as availability, performance, security and scalability play a role; (SW)</li> <li>• 3.9 Provide advice about the approach to take during the processing and consultation of large quantities of data with attention for privacy. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>Condition for participation in elective courses:</p> <ul style="list-style-type: none"> <li>• Propaedeutic year obtained.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Information Security	1916SEC04A
<b>Assessment objectives/criteria</b>	The student is able to understand, implement and control Information Security and Privacy guidelines.	
<b>Details of assessments</b>	Schriftelijk with test session	Written exam
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>	Written exam	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Secure Programming [ 1918SEC05Z ]

<b>Academic year</b>	<b>Term</b>	<b>Name of examination</b>	<b>Study load in credits</b>
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		<b>component</b>	
3	blok 4	Secure Programming	3

<b>Module name and code</b>	<b>Weighting factor</b>	<b>Assessment scale</b>	<b>Required minimum score</b>	<b>Number of study hours</b>
Secure Programming [ 1918SEC05A ]	100%	GRD (1 t/m 100)	55	84

<b>Content of unit of study</b>	<p>This course reveals the most common design and coding errors and explains how to fix each one-or better yet, avoid them from the start. This course covers all platforms, languages, and types of applications. Eliminate these security flaws from your code: SQL injection Web server- and client-related vulnerabilities Use of magic URLs, predictable cookies, and hidden form fields Buffer overruns Format string problems Integer overflows C++ catastrophes Insecure exception handling Command injection Failure to handle errors Information leakage Race conditions Poor usability Not updating easily Executing code with too much privilege Failure to protect stored data Insecure mobile code Use of weak password-based systems Weak random numbers Using cryptography incorrectly Failing to protect network traffic Improper use of PKI Trusting network name resolution.</p>
<b>Learning outcomes</b>	<p><b>Analysis:</b></p> <ul style="list-style-type: none"> <li>• 3.11 Define acceptance criteria based on quality properties and a risk analysis carried out with, among others, attention for security aspects; (SW)</li> <li>• 3.14 Describe security aspects of computer systems that are connected to or via (public) networks. (HW)</li> </ul> <p><b>Advise:</b></p> <ul style="list-style-type: none"> <li>• 3.8 Give advice concerning the choice of software architecture or existing software frameworks whereby cost aspects and quality properties such as availability, performance, security and scalability play a role. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<ul style="list-style-type: none"> <li>• Propedeuse achieved.</li> <li>• Internship completed satisfactory.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No

<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Secure Programming	1918SEC05A
<b>Assessment objectives/criteria</b>	The student is able to analyze the following security risks <ul style="list-style-type: none"> <li>• Input control;</li> <li>• Securing the web browser;</li> <li>• Access control;</li> <li>• Authentication;</li> <li>• Session management;</li> <li>• Injection;</li> <li>• Cryptography;</li> <li>• Error handling;</li> <li>• Low level problems.</li> </ul>	
<b>Details of assessments</b>	Schriftelijk with test session	Written test and assignments.
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>	Lecture	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project Offensive Security [ 1923SEC06Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 4	Project Offensive Security	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Final Report [ 1923SEC06A ]	100%	GRD (1 t/m 100)	55	84
Final Presentation [ 1923SEC06B ]	0%	SUS (Voldoende / Onvoldoende)	V	0

<b>Content of unit of study</b>	Almost daily news reaches us that the government or companies are dealing with cyber-attacks by hackers. Today's software engineering professionals must understand the basic discipline of building secure software. Not
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	<p>because “it’s a good idea”, but because the nature of the internet mandates it.</p> <p>This project covers simulating an attack on a supplied system. You will learn how the target system works, the weaknesses of this system and how to practically exploit these weaknesses and hack into it. You will be asked to report on your findings and advise a client on how to improve the security of a system.</p>
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>• 3.11. Define acceptance criteria based on quality properties and a risk analysis carried out with, among others, attention for security aspects. (SW)</li> <li>• 3.13. Describe security aspects of computer systems that are connected to or via (public) networks. (HW)</li> </ul> <p><b>Advise:</b></p> <ul style="list-style-type: none"> <li>• 3.8. Give advice concerning the choice of software architecture or existing software frameworks whereby cost aspects and quality properties such as availability, performance, security and scalability play a role. (SW)</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<ul style="list-style-type: none"> <li>• Propedeuse achieved.</li> <li>• Vocational internship with a pass</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Final Report	1923SEC06A
<b>Assessment objectives/criteria</b>	<p>Reporting the findings of a penetration test within a technical report, next to advising on how to improve the security of a system (English or Dutch):</p> <ul style="list-style-type: none"> <li>• <b>Management summary</b></li> <li>• <b>Introduction</b></li> <li>• <b>Approach and scope</b> The technical specifics of the test: what will be tested and what not?</li> <li>• <b>Findings</b> For each topic: <ul style="list-style-type: none"> <li>1 The vulnerability and risk;</li> <li>2 How to exploit;</li> <li>3 Remediation;</li> </ul> </li> </ul>	

	<ul style="list-style-type: none"> <li>• <b>Conclusion</b> Possible topics: <ul style="list-style-type: none"> <li>• The student is able to use public information (osint) to target and construct social engineering attacks. or</li> <li>• The student is able to find as many vulnerabilities as possible in a website. By a vulnerability we mean shortcomings that can affect the availability, integrity and / or confidentiality. or</li> <li>• The student is able to find as many vulnerabilities as possible in a API. By a vulnerability we mean shortcomings that can affect the availability, integrity and / or confidentiality of the API. or</li> <li>• The student is able to gain control of a computersystem using offensive security.</li> </ul> </li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	Written report.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	Consult	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Final Presentation	1923SEC06B
<b>Assessment objectives/criteria</b>	The student is able to justify and explain the findings and proposed remediation of the penetration report orally.	
<b>Details of assessments</b>	Andere wijze without test session	Presentation.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	Consult	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Research UX [ 1919UE005Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Research UX	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Research UX [ 1919UE005A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>The module focuses on the further development of research skills. The emphasis is on formulating good research questions, finding, assessing and using good sources and using an empirical research method to answer these questions. This module is a preparation for the graduation project in which doing research to support the final product is an important part. For this module, you write a paper together with a fellow student on a topic related to your minor. This paper is an elaboration of a well-founded research question which you will answer by means of desk research (e.g. on the basis of literature) and field research. For this paper, in addition to desk research, you base yourself on at least one other empirical research method (field research). For example, you can interview an expert or conduct a survey among your target group. You can also choose another method. Peer review is an important element in this module</p>
<b>Learning outcomes</b>	<p><b><u>Professionalisation:</u></b></p> <p><b><u>6.3.1 Self-steering ability:</u></b></p> <ul style="list-style-type: none"> <li>• Can detect, integrate and apply relevant knowledge and insights in new situations.</li> <li>• Takes his own task and role seriously.</li> </ul> <p><b><u>6.3.2 Social communication skills:</u></b></p> <ul style="list-style-type: none"> <li>• Can work together effectively in a team;</li> <li>• Can give and receive feedback;</li> <li>• Expresses effectively orally and in writing in correct, understandable and appropriate Dutch or English.</li> </ul> <p><b><u>6.3.3 Creativity and problem-solving ability:</u></b></p> <ul style="list-style-type: none"> <li>• Comes up with new ideas, approaches or insights.</li> <li>• Comes up with different solutions to a problem.</li> </ul> <p><b><u>Research skills:</u></b></p> <ul style="list-style-type: none"> <li>• 7.3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 7.3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 7.3.3 Making substantiated choices for research methods and instruments;</li> <li>• 7.3.4 Selecting and using relevant, reliable and current sources to support the research;</li> </ul>

	<ul style="list-style-type: none"> <li>7.3.5 Collecting, analysing and interpreting the relevant research data;</li> <li>7.3.6 Link substantiated conclusions and recommendations to research results.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	See admission requirements for the minor (elective education).
<b>Phase of Bachelor's programme</b>	hoofdphase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Research UX	1919UE005A
<b>Assessment objectives/criteria</b>	Research is reported in the form of a paper that is assessed on: <ul style="list-style-type: none"> <li>The quality of the research questions and objective;</li> <li>The quality of desk research;</li> <li>The quality of the field research;</li> <li>The quality of the analysis and the conclusion;</li> <li>The quality of reporting (language and readability).</li> </ul> Active participation in the peer review process is required.	
<b>Details of assessments</b>	Schriftelijk without test session	Written assignment: research paper on an IT subject, to be uploaded in GardeWork.
<b>Permitted Aids</b>	Not applicable.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	

## Project UX [ 1923UE004Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Project UX	6

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Alpha [ 1923UE004A ]	20%	GRD (1 t/m 100)	55	42

Release Candidate [ 1923UE004B ]	20%	GRD (1 t/m 100)	55	42
Beta [ 1923UE004C ]	30%	GRD (1 t/m 100)	55	42
Gold Master [ 1923UE004D ]	30%	GRD (1 t/m 100)	55	42

<b>Content of unit of study</b>	The students must develop a problem for an external client into a suitable design solution.
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Analysis of the user, user interaction and experience, both individually (physical, psychological, personal characteristics) and in a larger social context (social / cultural / ethical / technological). (UI)</li> <li>• 3.2 Analysis of the actual and state-of-the-art interactive technologies. (UI)</li> </ul> <p><b><u>Advise:</u></b></p> <ul style="list-style-type: none"> <li>• 2.1 Provide well-founded, concrete advice on the interactive techniques and/or interactive concepts to be used. (UI)</li> <li>• 2.2 Make proposals about the realisation choices, such as the technologies to be used, while keeping the users and company context in mind. (UI)</li> <li>• 3.2 Give advice on the UX intervention(s) in the current or next iterations. (UI)</li> </ul> <p><b><u>Design:</u></b></p> <ul style="list-style-type: none"> <li>• 3.2 Design a test with which the objectives can be evaluated from a user perspective. (UI)</li> <li>• 4.1 Design a user experience that takes into account the long-term strategy and organisational goals of the client. Here, one should anticipate relevant societal trends and technological developments. (UI)</li> </ul> <p><b><u>Manage &amp; control:</u></b></p> <ul style="list-style-type: none"> <li>• 3.2 Communicate with stakeholders and record decisions related to core values and user experience design during all phases of the development process. (UI)</li> </ul> <p><b><u>Realize:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Realise and test the UX of an interactive product, prototype, system or service on the basis of the design while using the appropriate tools and techniques during the project phases. (UI)</li> </ul> <p><b><u>Professionalisation:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Self-direction</li> <li>• 3.2 Social-communicative skills</li> <li>• 3.3 Creativity and problem-solving skills</li> </ul>



	<b><u>Research skills:</u></b> <ul style="list-style-type: none"> <li>• 3.1 Map out the relevant aspects of a complex problem.</li> <li>• 3.2 Clearly formulate the goal and research questions based on the problem analysis.</li> <li>• 3.3 Make substantiated choices concerning research methods and tools.</li> <li>• 3.4 Select and use relevant, reliable and up-to-date sources to support the research.</li> <li>• 3.5 Collect, analyse and interpret the relevant research data.</li> <li>• 3.6 Derive substantiated conclusions and/or recommendations from research results.</li> <li>• 3.7 Critically reflect on the research approach and the context in which it was performed.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ol style="list-style-type: none"> <li>1. The foundation year has been passed;</li> <li>2. The 3rd year internship has been successfully completed;</li> <li>3. A minimum of 130 EC has been achieved .</li> </ol>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	Alpha	1923UE004A
<b>Assessment objectives/criteria</b>	<p>The student presents in an Alpha presentation:</p> <p><b>1. Research and Data Analysis</b></p> <ul style="list-style-type: none"> <li>• Quality of the data analysis (Did the group have a clear picture of the problems outlined by your client?)</li> <li>• Is there additional research regarding the problem? (to what extent does the group validate or strengthen the input provided by the client through its own research?)</li> <li>• To what extent does the group clarify the core problem of the issue (Linking the data, main questions and sub-questions).</li> </ul> <p><b>2. Experience Mapping</b></p> <ul style="list-style-type: none"> <li>• A clear experience map has been created in which stages and tasks are described that are relevant for clarifying the problem. (Stages can be eg before, during or after a task or tasks)</li> <li>• Is there a logical relationship between the Data analysis, Main and / or sub-questions and the Experience map?</li> </ul>	

	<ul style="list-style-type: none"> <li>'Pain Points' and 'Goals' have been identified and are substantiated.</li> </ul> <b>3. Personas</b> <ul style="list-style-type: none"> <li>The personas are a clear representation of the target group and / or user population.</li> <li>The personas have relevant 'attributes', 'goals', 'concerns' and a 'quote'</li> <li>The personas are sufficiently distinctive in their definition to base different design decisions on.</li> </ul> <b>7. Presentation (Alpha)</b> <ul style="list-style-type: none"> <li>In the presentation, the main question and the sub-questions from the research are treated and clearly answered based on evidence from research or testing.</li> <li>The presentation is aimed at the client and teachers and offers, with substantiation, a suitable solution for the questions asked.</li> </ul> <b>8.Dossier/Log</b> <ul style="list-style-type: none"> <li>This log (physically or digitally) offers a good insight in the process the group went through for the Alpha presentation of their project. The file is up-to-date and well-structured. All processes, findings and decisions regarding points 1,2 3 and 6 are addressed.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	UXD Beta presentation (Assessment 2 of 4) The students present the (possible) solutions direction(s) (including first draft designs) and collect feedback. The students debrief the client.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	<p>Course developed as Living Lab (off-line). Attendance is mandatory.</p> <p>The student works the whole week on the assignment (partly independently). (exceptions only allowed after consult with relevant parties).</p> <p>No absence allowed on mandatory elements of the course.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b>Module with test</b>	Release Candidate	1923UE004B
<b>Assessment objectives/criteria</b>	<p>The student presents in the Release Candidate presentation:</p> <b>4. Ideation (Second draft)(Strengthened analysis compared to Beta / 90% final</b> <ul style="list-style-type: none"> <li>The ideation process surrounding the assignment is clearly communicated (it is clear which approach the group has</li> </ul>	

	<p>chosen)</p> <ul style="list-style-type: none"> <li>• Different ideas regarding (partial) solutions are clearly communicated (in image and / or text)</li> <li>• Pros and cons design directions are clearly communicated.</li> </ul> <p><b>5. Script &amp; Scenarios (Second draft)(Strengthened analysis compared to Beta / 90% final)</b></p> <ul style="list-style-type: none"> <li>• Scripts and / or scenarios are relevant tasks and / or objective based on the personas created. The scripts and scenarios fit within the answer to the main and sub questions of the problem.</li> <li>• The scripts and scenarios have been tested and the results of that test (or the adjustments) are communicated,</li> <li>• Scripts and / or scenarios are convincing in the sense that they are realistic and fit within the answers to the main and / or sub-questions.</li> </ul> <p><b>6. Prototype / PoC (Second draft)(Strengthened analysis compared to Beta / 90% final)</b></p> <ul style="list-style-type: none"> <li>• The PoC is a clear addition to answering the principal and / or partial questions of the client.</li> <li>• The flow (s) of the PoC is / are clear support for the scripts and / or scenarios outlined.</li> <li>• The interface and feedback from the PoC clearly fit in with the outlined tasks of the user population.</li> </ul> <p><b>7. Presentation (Release Candidate)</b></p> <ul style="list-style-type: none"> <li>• In the final presentation, the main question and the sub-questions from the research are treated and clearly answered based on evidence from research or testing.</li> <li>• The presentation is aimed at the client and, with substantiation, offers a suitable solution for the questions asked.</li> </ul> <p><b>8.Dossier/Log</b></p> <ul style="list-style-type: none"> <li>• This log (physically or digitally) offers a good insight in the process the group went through for the Release Candidate presentation of their project. The file is up-to-date and well-structured. All processes, findings and decisions regarding points 4,5,6 and 7 are addressed.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	UXD Release Candidate presentation. (Assessment 3 of 4) The students present the progress (including second draft designs) and collect feedback. The students debrief the client.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	<p>Course developed as Living Lab (off-line). Attendance is compulsory.</p> <p>The student works the whole week on the assignment (partly independently).</p> <p>(exceptions only allowed after consult with relevant parties).</p>	

	No absence allowed on mandatory elements of the course.	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Beta	1923UE004C
<b>Assessment objectives/criteria</b>	<p>The student presents in the Beta presentation:</p> <p><b>1. Data Analysis (Reinforced analysis compared to Alpha/90% final)</b></p> <ul style="list-style-type: none"> <li>• Quality of the data analysis (Did the group have a clear picture of the problems outlined by your client?)</li> <li>• Is there additional research regarding the problem? (to what extent does the group validate or strengthen the input provided by the client through its own research?)</li> <li>• To what extent does the group clarify the core problem of the issue (Linking the data, main questions and sub-questions).</li> </ul> <p><b>2. Experience Mapping (Reinforced analysis compared to Alpha/90% final)</b></p> <ul style="list-style-type: none"> <li>• A clear experience map has been created in which stages and tasks are described that are relevant for clarifying the problem. (Stages can be eg before, during or after a task or tasks)</li> <li>• Is there a logical relationship between the data analysis, Main and / or sub-questions and the experience map?</li> <li>• 'Pain Points' and 'Goals' have been identified and are substantiated.</li> </ul> <p><b>3. Personas (Reinforced analysis compared to Alpha/90% final)</b></p> <ul style="list-style-type: none"> <li>• The personas are a clear representation of the target group and / or user population.</li> <li>• The personas have relevant 'attributes', 'goals', 'concerns' and a 'quote'</li> <li>• The personas are sufficiently distinctive in their definition to base different design decisions on.</li> </ul> <p><b>4. Ideation (First draft)</b></p> <ul style="list-style-type: none"> <li>• The ideation process surrounding the assignment is clearly communicated (it is clear which approach the group has chosen)</li> <li>• Different ideas regarding (partial) solutions are clearly communicated (in image and / or text)</li> <li>• Pros and cons design directions are clearly communicated.</li> </ul> <p><b>• 5. Script &amp; Scenarios (First draft)</b></p> <ul style="list-style-type: none"> <li>• Scripts and / or scenarios are relevant tasks and / or objective based on the personas created. The scripts and scenarios fit within the answer to the main and sub questions of the problem.</li> </ul>	

	<ul style="list-style-type: none"> <li>• The scripts and scenarios have been tested and the results of that test (or the adjustments) are communicated,</li> <li>• Scripts and / or scenarios are convincing in the sense that they are realistic and fit within the answers to the main and / or sub-questions.</li> </ul> <p><b>6. Prototype / PoC (First draft)</b></p> <ul style="list-style-type: none"> <li>• The PoC is a clear addition to answering the principal and / or partial questions of the client.</li> <li>• The flow (s) of the PoC is / are clear support for the scripts and / or scenarios outlined.</li> <li>• The interface and feedback from the PoC clearly fit in with the outlined tasks of the user population.</li> </ul> <p><b>7. Presentation (Beta)</b></p> <ul style="list-style-type: none"> <li>• In the final presentation, the main question and the sub-questions from the research are treated and clearly answered based on evidence from research or testing.</li> <li>• The presentation is aimed at the client and, with substantiation, offers a suitable solution for the questions asked.</li> </ul> <p><b>8. Dossier/Log</b></p> <ul style="list-style-type: none"> <li>• This log (physically or digitally) offers a good insight in the process the group went through for the Beta presentation of their project. The file is up-to-date and well-structured. All processes, findings and decisions regarding points 1,2,3,4,5,6 and 7 are addressed.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	UXD Beta presentation (Assessment 2 of 4) The students present the (possible) solutions direction(s) (including first draft designs) and collect feedback. The students debrief the client.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	<p>Course developed as Living Lab (off-line). Attendance is compulsory.</p> <p>The student works the whole week on the assignment (partly independently). (exceptions only allowed after consult with relevant parties).</p> <p>No absence allowed on mandatory elements of the course.</p>	
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Nee	
<b><u>Module with test</u></b>	Gold Master	1923UE004D
<b>Assessment objectives/criteria</b>	The student presents in the Gold Master presentation: (All elements 100% final)	

	<p><b>1. The main and sub-question (original or revised)</b></p> <ul style="list-style-type: none"> <li>First, we like to know the main and sub-question (original or revised) that were the bases for the solution your team came up with.</li> </ul> <p><b>2. The 'highlights' of your research and your experience mapping (original or revised)</b></p> <ul style="list-style-type: none"> <li>We would like to hear the 'highlights' of your research and your experience mapping. (Methods and particulars that gave you the relevant data to work with)</li> </ul> <p><b>3. Personas (original or revised)</b></p> <ul style="list-style-type: none"> <li>We would like you to present your personas, particular the goals and pain points you trying to resolve for them.</li> </ul> <p><b>4. Ideation (Finalized)</b></p> <ul style="list-style-type: none"> <li>We would like an insight in your ideation process. What were initial ideas you came up with to remedy a particular issue? How did this idea develop over time? In what way did it end up in your proposed solution?</li> </ul> <p><b>5. Prototype / PoC with relevant Script &amp; Scenarios (Finalized)</b></p> <ul style="list-style-type: none"> <li>And of course, we want to see the final product! <u>Take us through a couple of good scenarios to show the relevance of your product for the client's issues.</u> Be smart and focus in your demo, first of all, on key functionality. Better to show three good ones than 6 half-baked. Prove your case before us that your product is a good vehicle for your client to build upon.</li> </ul> <p><b>8. Dossier/Log (Finalized)</b></p> <ul style="list-style-type: none"> <li>This log (physically or digitally) offers a good insight in the process the group went through for the Release Candidate presentation of their project. The file is up-to-date and well-structured. All processes, findings and decisions regarding points 4,5,6 and 7 are addressed.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	UXD Gold Master presentation . (Assessment 4 of 4) The students present the POC and explain/underpin their design choices The students debrief the client and hand over all relevant documentation.
<b>Permitted Aids</b>	n/a	
<b>Work methods and educational activities</b>	<p>Course developed as Living Lab (off-line). Attendance is compulsory.</p> <p>The student works the whole week on the assignment (partly independently).</p> <p>(exceptions only allowed after consult with relevant parties).</p> <p>No absence allowed on mandatory elements of the course.</p>	
<b>Contact hours for strategies</b>		

and teaching activities		
Compulsory attendance (See also Article 115 TER)	Nee	

## Psychology of Interaction [ 1918UE001Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Psychology of Interaction	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Psychology of Interaction [ 1918UE001A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	Students deepen their knowledge of relevant underlying psychological principles when designing user-centered, interactive systems. They apply these principles and previously acquired knowledge of HCI, UX and UCD to a project-related design problem.
<b>Learning outcomes</b>	<p><b>Analyze:</b></p> <ul style="list-style-type: none"> <li>3.1 Analysis of the user, user interaction and experience, both individually (physical, psychological, personal characteristics) and in a larger social context (social / cultural / ethical / technological). (UI)</li> </ul> <p><b>Advise:</b></p> <ul style="list-style-type: none"> <li>3.1 Translate the analysis into strategic recommendations (in the short, medium and long term) for the design or improvement or investigation of a UX by using interactive tools. Here, substantiated advice is also provided concerning the most suitable design process (for example, UCD). (UI)</li> </ul> <p><b>Professionalize:</b></p> <ul style="list-style-type: none"> <li>3.4 Awareness of social responsibility. Is aware of and supports the importance of ethics and social values for an organization.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>1. The foundation year has been passed;</li> <li>2. The 3rd year internship has been successfully completed;</li> <li>3. A minimum of 130 EC has been achieved.</li> </ul>

<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b>Module with test</b>	Psychology of Interaction	1918UE001A
<b>Assessment objectives/criteria</b>	<b>Psychology of Interaction</b> The student has insight into the psychological aspects that are important for the design of interactive systems. Possible topics that are discussed are: ergonomics and physical adjustments, memory and attention, affect, cognition and action, persuasive design, motivation, social interaction, perception and navigation and digital accessibility with regard to user centered design.	
<b>Details of assessments</b>	Schriftelijk with test session	An essay on the theory covered.
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	

## UX Methodologies [ 1919UE002Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	UX Methodologies	2

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
UX Methodologies [ 1919UE002A ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	The students learn the User Centered Design Methodology and train its application. The method involves Data analysis, Persona Creation, Ideation, Schript ~ Scenarios and Proto Typing.
<b>Learning outcomes</b>	<b>Analyze:</b> <ul style="list-style-type: none"> <li>3.1 Analysis of the user, user interaction and experience, both individually (physical,</li> </ul>



	<p>psychological, personal characteristics) and in a larger social context (social / cultural / ethical / technological). (UI)</p> <p><b><u>To advise:</u></b></p> <ul style="list-style-type: none"> <li>• 3.2 Give advice on the UX intervention(s) in the current or next iterations. (UI)</li> </ul> <p><b><u>Research:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Mapping the relevant aspects of a complex problem;</li> <li>• 3.2 Clear formulation of goal and research questions based on the problem analysis;</li> <li>• 3.3 Making well-founded choices of research methods and instruments;</li> <li>• 3.4 Select and use relevant, reliable and current sources to support the research;</li> <li>• 3.5 Collecting, analyzing and interpreting the relevant research data;</li> <li>• 3.6 Link substantiated conclusions and recommendations to research results;</li> <li>• 3.7 To reflect critically on the research approach and the context in which it was conducted.</li> </ul> <p><b><u>Professionalize:</u></b></p> <ul style="list-style-type: none"> <li>• 3.1 Self-direction;</li> <li>• 3.2 Social communication skills;</li> <li>• 3.3 Creativity and problem-solving ability.</li> </ul>
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>• 1. The foundation year has been passed;</li> <li>• 2. The 3rd year internship has been successfully completed;</li> <li>• 3. A minimum of 130 EC has been achieved.</li> </ul>
<b>Phase of Bachelor's programme</b>	hoofdfase
<b>Qualitative requirement BSR</b>	No
<b>Graduation product designation</b>	No
<b>Sets requirement for the work environment</b>	No
<b>Professional part</b>	No
<b>Specific details</b>	

<b><u>Module with test</u></b>	UX Methodologies	1919UE002A
<b>Assessment objectives/criteria</b>	The student works all week in the UX lab on the assignment.	
<b>Details of assessments</b>	Schriftelijk without test session	The student presents findings in an assessment.
<b>Permitted Aids</b>	None.	

<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	

## Workshop UX [ 1920UE003Z ]

Academic year	Term	Name of examination component	Study load in credits
3	blok 3	Workshop UX	3

Module name and code	Weighting factor	Assessment scale	Required minimum score	Number of study hours
Workshop 1 [ 1919UE003A ]	0%	SUS (Voldoende / Onvoldoende)	V	28
Workshop 2 [ 1918UE003B ]	100%	GRD (1 t/m 100)	55	56

<b>Content of unit of study</b>	<p>The students learn the User Centred Design Methodology and train its application. The methodology includes the phase: Data analysis, Persona Creation, Ideation, Script and Scenarios and Prototyping.</p> <p>With this methodology, the students have to define appropriate design solutions for customers.</p>
<b>Learning outcomes</b>	<p><b><u>Analysis:</u></b></p> <ul style="list-style-type: none"> <li>3.1 Analysis of the user, user interaction and experience, both individually (physical, psychological, personal characteristics) and in a larger social context (social / cultural / ethical / technological); (UI)</li> <li>3.2 Analysis of the actual and state-of-the-art interactive technologies. (UI)</li> </ul> <p><b><u>Advise:</u></b></p> <ul style="list-style-type: none"> <li>3.1 Translate the analysis into strategic recommendations (in the short, medium and long term) for the design or improvement or investigation of a UX by using interactive tools. Here, substantiated advice is also provided concerning the most suitable design process (for example, UCD). (UI)</li> </ul> <p><b><u>Design:</u></b></p> <ul style="list-style-type: none"> <li>3.1 Translate the advisories into a concrete and detailed UX design appropriate to the project phases; (UI)</li> </ul>

	<ul style="list-style-type: none"> <li>3.2 Design a test with which the objectives can be evaluated from a user perspective. (UI)</li> </ul> <p><b>Realisation:</b></p> <ul style="list-style-type: none"> <li>3.1 Realise and test the UX of an interactive product, prototype, system or service on the basis of the design while using the appropriate tools and techniques during the project phases. (UI)</li> </ul> <p><b>Research skills:</b></p> <ul style="list-style-type: none"> <li>3.1 Map out the relevant aspects of a complex problem;</li> <li>3.2 Clearly formulate the goal and research questions based on the problem analysis;</li> <li>3.3 Make substantiated choices concerning research methods and tools;</li> <li>3.4 Select and use relevant, reliable and up-to-date sources to support the research;</li> <li>3.5 Collect, analyse and interpret the relevant research data;</li> <li>3.6 Derive substantiated conclusions and/or recommendations from research results;</li> <li>3.7 Critically reflect on the research approach and the context in which it was performed.</li> </ul> <p><b>Professionalisation:</b></p> <ul style="list-style-type: none"> <li>3.1 Self-steering ability;</li> <li>3.2 Social communication skills;</li> <li>3.3 Creativity and problem-solving ability.</li> </ul>	
<b>Requirements for participation in units of study (See also article 31a TER)</b>	<p>To be able to start elective education, the following admission requirements apply:</p> <ul style="list-style-type: none"> <li>1. The foundation year has been passed;</li> <li>2. The 3rd year internship has been successfully completed;</li> <li>3. A minimum of 130 EC has been achieved.</li> </ul>	
<b>Phase of Bachelor's programme</b>	hoofdfase	
<b>Qualitative requirement BSR</b>	No	
<b>Graduation product designation</b>	No	
<b>Sets requirement for the work environment</b>	No	
<b>Professional part</b>	No	
<b>Specific details</b>		
<b>Module with test</b>	Workshop 1	1919UE003A
<b>Assessment objectives/criteria</b>	<p>The student learns the defined UX research methodology and is able to use it:</p> <ul style="list-style-type: none"> <li>Identify the problem;</li> <li>Identify and validate the relevant requirements;</li> <li>Document the requirements adequately;</li> <li>Identify functional and non-functional design elements;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Work out a prototype.</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p>The student presents according to the steps of the method:</p> <ul style="list-style-type: none"> <li>• Assessment 1 (of 2): Interim report (after week 1) in which research results and possible solutions are presented.</li> </ul>
<b>Permitted Aids</b>	None	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	
<b><u>Module with test</u></b>	Workshop 2	1918UE003B
<b>Assessment objectives/criteria</b>	<p>The student is able to use the taught methodology and:</p> <ul style="list-style-type: none"> <li>• Identify the problem;</li> <li>• Identify and validate the relevant requirements;</li> <li>• Document the requirements adequately;</li> <li>• Identify functional and non-functional design elements;</li> <li>• Develop a prototype.</li> </ul> <p>The research is clearly more in-depth than the research from workshop 1/UXD Methodologies:</p> <ul style="list-style-type: none"> <li>• Presenting an interim report (data analysis, persona, ideation);</li> <li>• Present a final report including prototype (data analysis, persona, ideation, script and scenario, prototype/demo).</li> </ul>	
<b>Details of assessments</b>	Andere wijze without test session	<p>The student presents according to the steps of the method:</p> <p>2/ Assessment 2 (of 2): Final report (after week 2) with final research results and including a solution proposal in the form of a prototype and demo.</p>
<b>Permitted Aids</b>	None.	
<b>Work methods and educational activities</b>		
<b>Contact hours for strategies and teaching activities</b>		
<b>Compulsory attendance (See also Article 115 TER)</b>	Ja	