**Implementation Regulations CER HZ** 

**Bachelor** 

**HBO-ICT** 

**Full-time** 

**CROHO 30020** 

2022-2023



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# **CHAPTER 1 GENERAL PROVISIONS**

# 1.1 <u>General</u>

- 1.1.1 The HZ Course and Examination Regulations Bachelor programme full-time (hereinafter: HZ CER ba ft) cover the core of education within the HZ. This document provides a general overview of all programmes taught at the HZ. The HZ CER Ba ft contains institution-specific provisions, i.e. those that apply to the entire HZ. A programme-specific HZ CER Implementation Regulation (hereinafter: Implementation Regulation) is determined for each programme by the executive board each year.
- 1.1.2 The HZ Course and Examination Regulations Bachelor programme full-time applies to this HZ CER Implementation Regulation Bachelor programme full-time.
- 1.1.3 The Dutch Higher Education and Research Act (WHW) as well as the HZ CER ba ft mention study credits. These Implementation Regulations, in addition to the term credits, also refer to ECTS (European Credits Transfer System), where 1 ECTS is equal to 1 credit and thus a study load of 28 hours (article 7.4 paragraph 1 of WHW).

# 1.2 Establishment and evaluation

- 1.2.1 The process of establishment and evaluation of this Implementation Regulation is described in article 1.3.4 CER HZ ba ft.
- 1.2.2 The programme committee evaluates the manner of implementation of the education and examination regulations and the Implementation Regulations in question every year (article 1.3.4 CER HZ ba ft).

# 1.3 <u>Programme committee</u>

- 1.3.1 The Programme Committee is provided the opportunity to advise the Executive Board before the Implementation Regulations are determined.
- 1.3.2 The Programme Committee assesses the execution of the Education and Examination Regulations and the Implementation Regulations annually.

# 1.4 Director

- 1.4.1 The appointed director is responsible for:
  - a. the execution of the CER HZ;
  - b. the implementation and execution of the Implementation Regulations;
  - c. the annual evaluation on behalf of the Executive Board of the CER HZ and the Implementation Regulations, in which he measures and monitors the amount of time students need and adjust the study load, if necessary (article 7.14 WHW);
  - d. preparing the adjustments to the Implementation Regulations..

# **CHAPTER 2 IMPLEMENTATION REGULATIONS**

# 2.1 Registration, prior educational requirements, and admission policy

2.1.1 **Overview of additional prior educational requirements** (article 2.3 HZ CER Ba ft in addition to the requirements as listed under article 2.2 and 2.2a and 2.2b of HZ CER Ba ft)

### Legend

- ✓ Admissible
- X Not admissible

Students with a HAVO diploma				
Havo profiles:	NT	NG	EM	СМ
Admissible:	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$

Students with a VV	VO diploma			
Vwo profiles:	NT	NG	EM	СМ
Admissible:	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$

# 2.1.2 International enrolment 240 EC Track (article 2.2, 2.3, 2.8 CER HZ ba ft)

International students are admissible to the standard four-year programme only, if Nuffic has determined that their diploma is equal to the Dutch HAVO or VWO diploma.

# 2.1.3 Deficiency investigation (article 2.4 CER HZ ba ft)

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

# 2.1.4 Additional requirements (article 2.5 CER ba ft)

No additional requirements apply to the HBO-ICT Programme.

# 2.2 Programme and education structure

### 2.2.1 Programme profile (article 3.2 CER HZ Ba ft)

The study programme profile of ICT is based on the domain description Bachelor of ICT of HBO-I (Hoger Beroepsonderwijs ICT-opleidingen/Applied higher educational ICT-programs). <sup>1</sup>

The HBO-I domain description (further named domain description) serves as a functional qualifications framework for universities and focuses on the starting proficiency of future ICT professionals.

The HBO-I domain description is a national framework for the final qualifications for graduates of Dutch programmes for higher professional education (HBO in Dutch) in the ICT domain at an Associate, Bachelor and Professional Master degree level. The domain description is maintained by the HBO-I foundation. Related to and inspired by international developments, frameworks and formats, the domain description is periodically updated in collaboration with the business community and is established by The Netherlands Association of Universities of Applied Sciences. (HBO-I, 2018)

The domain description holds an account for the relevant competences (body of knowledge and skills), the breakdown of competences into professional duties including some examples of characteristic professional situations of starting ICT professionals. These examples function as illustrations of elements of the model and create a clear connection with the professional practice.

In order to keep up with the rapidly developing ICT field, the domain description will be regularly modified and updated. A HBO-I taskforce has developed a Data Science addendum for the domain description. In anticipation of this we already have added an architectural layer, Data Science. This will be modified later to fit the HBO-I domain description, when it will be officially updated (expected somewhere in 2023).

The main focus of the programme is solving problems or improving processes, either individually or in a group, by using ICT. Therein the programming skills are an essential skill but the main focus is on the analysing and problem solving skills. Therefore the professional skills of our ICT students are an important focus throughout our whole program. The program focuses on three main aspects namely data science, software engineering and IT consulting.

#### Themes of real life cases

In the study programme there is a focus on real life casus. These cases will be chosen in the sectors that are important to the Dutch and Zeeland (local) environment. These themes will focus on water related issues, issues concerning the energy transition, renewed food sources, and a vital region to live in (safety, quality of life and mobility). Our IT students learn to change the world one bit(e) at a time.

ICT graduates are characterised by analytical, problem solving and strong advising skills. Our graduates are very adaptable to change, very service oriented and able to communicate clearly and reflect on their professional life on a structural basis. ICT can be used for good and for bad. Our

<sup>&</sup>lt;sup>1</sup> Based on the 2018 version of the HBO-I domeinbeschrijving (<u>https://HBO-I.nl/domeinbeschrijving/</u> (retrieved, April 4, 2022)

graduates have learned to use ICT for good, experienced in a variety of projects that use ICT to innovate and equipped with a strong moral and ethical compass.

IT graduates can work in a wide variety of IT jobs. A few years into their careers they might move on to managerial positions such as project manager or senior developer, head of department or to positions such as, Senior consultant, Team lead, SCRUM master, instructor/supervisor, IT professional and so on. They could also end up working in the educational sector, for example as a teacher or supervisor, or in a commercial position in the private sector. An HBO degree in ICT also forms a good basis for a professional master or academic master programme in, for example, software engineer, data sciences, artificial intelligence, computer science, security or more specific oriented IT masters in a certain field. Such a programme can generally be taken in an accelerated form at one of the research universities.

# 2.2.2 Learning outcomes (art 3.2 OER HZ)

The ICT program is offered in Dutch and English. Because the content of our program is important information to understand completely Figure 1 and this paragraph described in English. These competences are according to the HBO-I domain description (see article 2.2.1). with data science as an addition. The profile matrix that is designed for the domain description contains three dimensions named in figure 1.

Dimension	Represents
Activity	what does an ICT professional do?
- Analysia	
Analysis	
Advise	
• Design	
Realisation	
Manage & Control	
ICT-architectural layers	within which context?
User interaction	
Organisational Processes	
Software	
Infrastructure	
Hardware interfacing	
Data science	
Proficiency levels <sup>2</sup>	how complex is it?
,	

Figure 1: Dimensions of the domain description Bachelor of ICT.

<sup>&</sup>lt;sup>2</sup> The proficiency level is determined by the complexity of the context, the complexity of the content and level of autonomy involved in carrying out the assignment. A proficiency level is achieved when two of these facets reach the level concerned. For the third proficiency level, the autonomy and the complexity can be at level three of the context level, for example, while the complexity of the content is at level two. But it is also possible that the complexity of the context and the content are at level three while the autonomy is at level two. Further explanation of the four proficiency levels is in the domain description chapter 2.1.

By operationalizing of the dimensions in these matrices each program creates their own program profile. This is displayed in a matrix with the ICT-architectural layer and activity. For each cross-section one or more professional tasks are defined on a certain proficiency level.

## Cohorts 2019-2020 and newer

In the basis we have a broad ICT bachelor. The first two years is almost the same for everyone. The first year focusses on software engineering, learn to use your tools; most important the programming skills. The second year we focus more on the value created for the customer (by using ICT) this is called digital innovation and transformation and students get to know data science and AI. During the second year there are two times, courses of choice for students. The course data driven business (for study track BIC or DS) and the course software design (for study track SE or DS). And the course Data Visualisation (for study track BIC or DS) and the course Cloud computing (for study track SE and DS). At the end of the second year students can choose three study tracks; Software Engineering (SE), Data Science (DS) and Business IT Consultant (BIC). The chosen study track will be on the addendum of the official certificate (HBO-ICT). The Overall program profile is visualized in Figure 2. The three tracks with each profile are visualized in attachment 1.

	Analysis <sup>34</sup>	Design <sup>56</sup>	Realisation <sup>78</sup>	Advise <sup>910</sup>	Manage & Control
User Interaction	2	2	2	0-2	
Organisational Processes	2-3	1-3	0-2	2-3	0-3
Infrastructure	0-1	0-2	1	0-2	2
Software	2-3	2-3	1-3	0-3	3
Hardware Interfacing	1		0-1		
Data Science	0-3	0-3	0-3	0-3	-
Professional Skills	3	2-3	3	3	

*Figure 2: Program profile from cohort 2020-2021 and newer.* 

<sup>&</sup>lt;sup>3</sup> For DS this is: Set up a DS process

<sup>&</sup>lt;sup>4</sup> For PSK this is: Personal Leadership

<sup>&</sup>lt;sup>5</sup> For DS this is: Collect and Address relevant data

<sup>&</sup>lt;sup>6</sup> For PSK this is: Targeted Interaction

<sup>&</sup>lt;sup>7</sup> For DS this is: Evaluate and Deploy results

<sup>&</sup>lt;sup>8</sup> For PSK this is: Future-oriented Organisation

<sup>&</sup>lt;sup>9</sup> For DS this is: Perform Data Analysis

<sup>&</sup>lt;sup>10</sup> For PSK this is: Investigative Problem Solving

## Cohorts 2017-2018 till 2018-2019

Before 2019-2020 there was one course of choice less. Therefore, the profiles are slightly different. The three tracks together with their own profile are visualized in the attachment of the CER 2020-2021.

	Analysis <sup>1112</sup>	Design <sup>1314</sup>	Realisation <sup>1516</sup>	Advise <sup>1718</sup>	Manage & Control	Agile <sup>19</sup>
User Interaction	2	2	2	0-2		
Organisational Processes	2-3	1-3	0-2	2-3	0-3	
Infrastructure	0-1	0-2	1	0-2	2	
Software	2-3	2-3	2-3	0-3	3	
Hardware Interfacing	1		0-1			
Data Science	0-3	0-3	0-3	0-3	-	
Professional Skills	3	2-3	3	3		3

Older programmes are transposed to this curriculum.

<sup>&</sup>lt;sup>11</sup> For DS this is: Set up a DS process

<sup>&</sup>lt;sup>12</sup> For PSK this is:Personal Leadership

<sup>&</sup>lt;sup>13</sup> For DS this is: Collect and Address relevant data

<sup>&</sup>lt;sup>14</sup> For PSK this is: Targeted Interaction

<sup>&</sup>lt;sup>15</sup> For DS this is: Evaluate and Deploy results

<sup>&</sup>lt;sup>16</sup> For PSK this is: Future-oriented Organisation

<sup>&</sup>lt;sup>17</sup> For DS this is: Perform Data Analysis

<sup>&</sup>lt;sup>18</sup> For PSK this is: Investigative Problem Solving

<sup>&</sup>lt;sup>19</sup> Agile is a way of working in which we bring together al professional skills and test them in a project setting in a holistic way.

L. Use	r interaction
1.1	analyse
В	You describe the important consequences for UX based on a target group analysis[B5] & [B6]
1.2	Design
В	You describe UX test strategies suitable for a given situation[B5]
_	Realise
А	You can apply design guidelines and corporate branding when realising a simple interaction within an information system [B3]
	You can realise a simple interaction within a team while taking into account consistency and standards [B3]
B C	
	You can help a user with preventing, recognising and solving erroneous actions in a consistent manner within a team [B4]
D	You can help a user with recognising and solving erroneous actions [B4]
E	You can apply standards and internal consistency when developing more complex functions within an application [B4]
К	You describe the correct implementation of UX design choices [B5]
L	You write a UX report accounting for design choices based on guidelines, human factors and/or emotional design.[B6]
М	You test the UX of a product in a UX test report to evaluate the quality[B6]
Ν	You recommend further development steps based on the UX test report[B6]
1.4	Advise
А	You can draw up a datavision goal based on the project context and business goal taking into account the goal, the target group and the message. [B8]
В	You can make a sound choice for a datavisualisation type suitable for the datavisualisation goal [B8]
С	You can make a sound choice for visual elements suitable for the datavisualisation goal [B8]
D	You can realise a datavisualisation based on sound research. [B8]
2. Org	anization processes
2.1	analyse
А	map, according to the given methodology, the current situation of a singular company process (IST) [B3]
В	analyse the performance of an organization through a standard methodology. [B7]
С	map an organization process of an existing organization by using suitable methodologies. [B7]
D	you assess a given situation on various security aspects. [B7]
Е	you understand the importance of a sound BI report (B14)
F	you understand what the necessity of BI is for companies (B14)
G	You can independently make a validated process analysis for an ICT provision in the context of an internship [INTERNSHIP BIC]
н	you clarify the company's current situation through coordinated KPIs and an obtained data set and you make an inventory of where the company can still take
	steps for improvement. Taking into account improvements in, among other things, new technologies.[S7]
I.	you map the branch and the company and you analyse how that process contributes to the company's goals [B7]
J	You can independently make a validated process analysis (IST) for the ICT provisions in a complex context [S8]
К	Students are capable of understanding the need for business to embrace data and can report what their maturity in this field is [B7]
2.2	Design
A	describe, according to a given methodology, a design for an improved company process through ICT (soll) [B3]
В	you can map sound change strategies, so that you can choose the right strategy for the right change/company in a methodical way. (B13)
С	you understand the ETL and the matching report process. (B14)
D	You can independently make a validated process design and understand the relationship with the information provision in the context of an internship.
Е	[INTERNSHIP BIC] you analyse the IST of the processes within the company and you come up with realistic improvement proposals based on the various models and your own
L.	vision (SOLL). [S7]
F	You can independently make a validated and considered process design (SOLL) in a complex context. [S8]
2.3	Realise
А	you create KPIs for a dataset that you substantiate yourself and create a matching BI report. (B14)
в	you carry out the entire process from importing the data to creating the report. (B14)
с	you realise and evaluate an implementation (plan) based on your own design, so the company has a ready made plan to follow through with the
	implementation of the changes. [S7]
D	you describe (and carry out if possible) a relevant change management method and strategy in which you help the employees with the changes they are about
Е	to encounter so that you can help resolve possible resistance. [S7] You independently realise an implementation(plan) and test the acceptance in a complex context. [S8]
	Advise
2.4 A	you submit a sound analysis report based on a company organization analysis. [B7]
B	You can independently give thorough organizational advice by using ICT possibilities in the context of an internship. [INTERS HIP BIC]
D C	you advise in a well-argued manner the best option for change based on your own vision/core values, a theoretical change model and the core values of the
C	company. [S7]
D	You can independently give a sound organizational advice for implementing ICT possibilities in a complex context. [S8]
Е	Students understands how a company's data maturity fits in a broader context of data strategy [B6]

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F	Students can advise about the future perspective of data driven business. [B6]
2.5	5 Manage & Control
Α	You can independently draw up a management plan for ICT processes in a internship context according to a chosen framework, taking into account updating,
	design, maintenance and quality assurance. [INTERNSHIP BIC]
В	you manage the company processes and ensure that they grow with the company or that there is a plan with which these processes are kept up-to-date, taking
	into account updating, design, maintenance and quality assurance. [S7]
С	You can independently draw up a control plan for ICT processes in a complex context. [S8]
3. Inf	irastructure
3.1	1 analyse
3.2	2 design
А	The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions.[B8]
3.3	3 Realise
A	Make available a software system based on a Framework for users in a simple hosting environment [B4]
3.4	4 Advise
A	The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider. [B8]
_	5 Manage & Control
A	The student can select and employ and react accordingly on the generated metrics for a cloud application control tools. [B8]
	ftware
_	1 analyse
A	(group) you determine the systems context of a system to be developed [B3]
В	(individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3]
С	(individually) you interpret collected data from the functional perspective to formulate and document requirements according to given standard method in
	natural language [B3]
D	develop acceptation criteria for a user story [B4]
E	you determine the System and the Systems context for a system to be developed with one interested party [B4]
F	you collect information so as to formulate functional requirements for a system to be developed according to a standard method [B2]
G	you document functional requirements for a system to be developed in natural language and in models through a given standard method [B4]
M	
Ν	You can independently make an analysis of a software engineering design problem in an internship context. [INTERNSHIP SE]
0	you describe functional and quality specifications and limiting preconditions, in which at least maintenance and manageability are included in the local
	infrastructure and development processes. [S7]
Ρ	you use various types of sources and techniques for collecting specifications and preconditions. [S7]
Q	You can validate the formulated specifications and preconditions and thus assess the degree of completeness and objectivity. [S7]
R	You can thoroughly describe a technical and/or process-related problem concerning the production of software.
S	You independently make an analysis of a software engineering design problem in a complex context [S8]
Т	You develop empathy for stakeholders to determine their challenges [B5]
U	You create innovative ideas based on a defined problem [B5]
v	You develop a prototype based on a validated idea [B5]
W	
4.2	2 design
A	you design a database of a simple information system and document this by means a standard modelling technique [B3]
В	You can make a functional design of a simple function of a system yet to be developed, and document it through a standard modelling technique. [B3]
c	You can make a technical design of a simple function of a system as yet to be developed, and document it be means of a standard modeling technique [B3]
D	you communicate more complex concepts and designs univocally with the professional field [B4]
E	you write a technical description of (the internal) structure and working of an Object Oriented information system.[B2]
F	You can solve a problem occurring in the market and involve the right stakeholders. [B6]
G	you generate new insights by translating a solution into an MVP, test it, and analyse the metrics (results) [B6]
	you make a first overview of a business model. [B6]
J	you describe the needs of the users of the software system to be developed.[B6]
К	you draw up a functional design for a complex part of a software system [B6]
L	you determine the quality of the design, for example through testing or prototyping, taking into account the formulated quality characteristics (ISO 25010) [B6]
Μ	
Ν	you write a techspecs report as reference that can be transferred to third parties [B6]
0	you recognise and explain with which programming techniques you can solve certain software problems (B13)
Ρ	You can independently select, document, communicate and evaluate solutions for a software engineering design problem in an internship context using tests
	and prototypes [INTERSHIP SE]
Q	you evaluate solutions based on the stated specifications and limitations (consistency) using tests, prototypes and comparable techniques. In addition, you
	analyse data collected with qualitative and/or quantitative analysis techniques. [S7]
R	you select candidate solutions based on relevant, current and specialist professional knowledge from the ICT domain. [S7]

S	you apply appropriate schematic techniques in the document where possible, which are in line with the chosen design strategy and goaled at the target group,
	which in any case consists of developers who (further) develop the product. [S7]
-	
T	You can independently select, evaluate (partial), document and communicate solutions for a software engineering design problem in a complex context. [S8]
U	You can create measurable non-functional requirements for a given system [B5]
V	You can design a substantiated architecture of a software system [B5]
W	You can derive and interpret performance metrics for a given system [B5]
4.3	Realise
А	You can realise a simple function within given concepts of a Framework [B3]
В	You can test a software system based on a Framework on the own work environment [B3]
с	Deliver Code that is acceptable for a production environment [B4]
D	Within a given framework context apply a more complex concept [B4]
E	Within a given organization and framework context develop an innovation [B4]
F	you apply Object Oriented programming concepts to realise functionality.[B2]
G	you apply programming concepts to realise functionality (Miller: 1. prescriptive, 2. applying) [B1] [B2]
н	you write readable, well-organized code (Miller: 1. prescriptive, 2. applying) [B1] [B2]
I.	you make robust code (Miller: 1. prescriptive, 2. applying) [B1] [B2]
J	Indicate for a given code example/class diagram which design patterns were applied. [B5]
	Apply a suitable design pattern for a given situation and work it out in both a class diagram and actual code. [B5]
K	
L	Recognise weak points in code, so-called code smells, and apply an appropriate standardised remedy, so-called refactoring. [B5]
Μ	you apply the right combination of programming techniques for the problems in a complex software system.(B13)
Ν	you perform a security audit through a given model. (B14)
0	You can independently realise a suitable solution for a software engineering design problem in an internship context. [INTERNSHIP SE]
Р	you realise (prototypes of) a system existing of several sub systems and/or existing components [S7]
Q	You can do research into the quality of the realised software such as functionality, security and performance. [S7]
R	You independently realise a suitable solution to a software engineering design problem in a complex context, independently. [S8]
S	You can implement a component for a given architecture [B5]
4.4	Advise
А	You can independently give a suitable advice for solving a software engineering design problem in an internship context. [INTERNSHIP SE]
В	you write a suitable advice on the results of a security research that was held. (B14)
С	you explain the results of the security audit according to a model. (B14)
D	you advise the customer on a solution for a software problem, convince the customer that the solution is in line with his/her objective and vision and you
	support the customer in the implementation of the solution or you give you process-oriented advice. [S7]
Е	You independently give a suitable advice for solving a software engineering design problem in a complex context. [S8]
	Manage & Control
А	You can organize and use tools to exchange code and documentation within a team [B3]
В	Use the project tools to improve the process of analysis, design, realization, testing and making functions available in an application[B4]
C	You can set up an environment on your working environment using virtualization and use it to test code. [B3]
D	you set up (generic) servers to make an application available [B4]
E	you use containerisation to make an application available and modify it [B4]
F	Master the advanced features of the distributed version control system (DVCS) Git to enable effective collaboration on a software project. [B5]
G	Achieve manageability of your software project releases by choosing a branching model and corresponding workflow. [B5]
н	Design a deployment pipeline that runs an existing open source software application and generates an automatic build. [B5]
I.	Proof your solution by performing a complete release from a change in code that generates corresponding executables executing all the steps of a release
	management cycle. [B5]
J	Guarantee software quality by enabling quality tools and executing unit tests.[B5]
к	you ensure confidentiality of a data set by applying cryptography [B7]
	dware Interfacing
_	analyse
э.1 А	you describe the foundations of a computer system [B1]
	a Science (Cisp-DM Cycle)
	You set up a data Science process
CRI	SP-DM phase(s): Business Understanding + Data Understanding
А	You can define and report the customers organisation and its problem [B7]
В	You can define & provide data mining goals [B7]
С	You can define business objectives and are aware of the need of information by the business [B7]
D	You can collect provided data sets and make them usable for the data science process [B7]
E	You describe collected and needed data by data types and metadata [B7]
F	You define data mining goals success criteria [B8]
G	You describe data mining activities based on choice of a basic machine learning model and relevant required activities [B8]

6

H       You add extra self-organised and/or external data sources to the data science process [B8]         I       You can compose a data management plan for a specific project, taking in account al facets of a given, recognised standard         J       You describe data mining activities based on choice of the best applicable machine learning model and relevant required a         K       You can independently set up a data science process in a internship context. [INTERNSHIP DS]         L       You can independently set up a data science process in a complex context. [S8]         6.2 You collect and address relevant data         CRISP-DM phase(s): Data Understanding + Data Preparation         A       You generate basic statistics summaries exploring data [B7]         B       You create a basic quality description to validate relevant data [B7]         C       You will exclude/include rows & columns to select relevant data [B7]         D       You clean data in order to achieve correct data types and handle missing values [B7]         E       You will perform basic feature extraction to construct correct and usable data [B7]         F       You (re-)validate data after model generated assumptions [B8]         H       You construct data by imputating and scaling relevant data [B8]         I       You construct data by merging multiple data sources [B8]         K       You construct data by merging multiple data sources [B8]         K       Y	
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L You validate data through statistical testing [S7]	
M You imputate relevant values to the chosen data to substitute missing values [S7]	
N You construct data by feature extracting (aggregates, target encoding) and/or unstructured data [S7]	
O You integrate relevant data by merging & joining across multiple levels [S7]	
P You convert data formats using sparse representation and include useful generators to enhance performance of your tech	
Q You independently collect and address relevant data in a internship context [INTERNSHIP DS]	
R       You independently collect and address relevant data in a complex context [S8]         6.3 You perform data analysis	
CRISP-DM phase(s): Modelling	
A You define metrics, independent records, & targets to generate a test design [B7]	
B You build the model and benchmark the predictions with basic statistic tooling [B7]	
C You assess relevant model(s) by the chosen metric [B7]	
D You split data into test & train sets to generate a test design [B8]	
E You build & train relevant model(s) and create predictions using the model(s) on test data set [B8]	
F You assess the model(s) on chosen metrics of the defined success criteria [B8]	
G You define a test design using cross validation & time splits [S7]	
<ul> <li>H You build a model taking feature selection, model tuning, bias, variance over/under fitting &amp; learning curves into account [</li> </ul>	[57]
You asses your model outcome using advanced metrics and graphical aids [S7]	[2,1]
J You can independently perform data analysis in a internship context. [INTERNSHIP DS]	
K       You can independently perform data analysis in a complex context. [S8]         6.4 You evaluate & deploy results of the data science process	
CRISP-DM phase(s): Evaluation + Deployment	
<ul> <li>A You summarise and evaluate results with business objective(s) [B7]</li> <li>B You set up a list of actions to determine following steps [B7]</li> </ul>	
C You produce a final report and present this to customer [B7]	
D       You review the data science process and you determine, and also report, lessons learned [B7]         E       You evaluate and match success criteria with business objectives of the data science process [B8]	
F You determine next steps and setup an advisory report for follow-up [B8]	
G You produce a deliverable for customer [B8]	
<ul> <li>H You review the data science process and collect lessons learned on process &amp; product [B8]</li> <li>I You determine the next steps in a additional data science process cycle providing a conclusion supplemented with recomm</li> </ul>	nondations [67]
J You advice the business successively implementing the data science process by a plan [S7]	
K You can independently evaluate and deploy results of a data science process in a internship context. [INTERNSHIP DS]	
L You can independently evaluate and deploy results of a data science process in a complex context. [S8]	
7. Professional Skills	
7.1 Professional Skills	
M you can employ the right professional skills to complete a project successfully in a complex environment [S7]	
N you account for the choices made regarding the professional skills employed [S7]	
	8)

Q	You can function professionally in a company-related, ICT-related environment. [INTERNSHIP]
7.2 9	show personal leadership. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2 (Context:
	ctured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
D	you form an ethical opinion on a security-related case, taking into account the opinions of people who may think differently. [B7]
ĸ	You can create a website as introduction to the program, include your motivation and show that you improve the website based on received feedback. Leading
ĸ	to a website that is improved in quality and attractiveness [B1]
_	
L	Developing skills and behavior to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals, community
	goals and personal goals.
М	Developing skills and behavior to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals through
N	participation in a project week.
Ν	Developing skills and behavior to achieve personal and professional goals. Carrying out activities that contribute to personal goals through participation in an international week.
0	You're considerate, see opportunities and seize them. You have a proactive attitude that you take initiative and feel responsible for what you do.
P	You can motivate yourself and others, you are willing to help others / support (individual and team). You can present yourself or a team, take others into your
	own development.
Q	You study demonstrates considered, strengthens your own learning and can recognize a learning need in yourself and mating act, reflect, evaluate, and give
	active feedback questions. You recognize when you need help and do it then.
	You can enable what turns of professional you want to be and / or what turns of positions you agains, lynow your own strengths and weakpasses and can describe
R	You can specify what type of professional you want to be and / or what type of positions you aspire, know your own strengths and weaknesses and can describe yourself well.
7.3	Interact purposefully. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2 (Context:
	ctured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
A	you read IT-oriented English literature on HBO entrance and can extract the necessary knowledge from it
в	you write IT-related English documentation on HBO entrance level, suitable for the message you want to convey and aimed at the target group.
c	You focus on the various groups of stakeholders such as partners, interest groups, individual team members etc.
D	You focus on what you want to communicate and what purpose you choose the most appropriate form and while you perform this proactively.
E	You focus on your role in the context of the ICT job, you recognize these tasks and takes proactive. You dare others to speak (feedback) and is open to feedback.
-	You are open to other opinions / views / arguments and see that as an enrichment. You consciously builds confidence in an interdisciplinary and intercultural
	cooperation context.
F	you have mastered the Dutch (for Dutch track) or the English (for English and Dutch track) language in writing on level 3F(B2) (conditionally and thus tick-off
	test within the course)
Н	You can read English for orientation (B2/C1)
1	You can write formal English texts (B2/C1)
J	You can give in English an verbal presentation
К	you can communicate in a sound way with various departments within a company, taking into account hierarchical layers. (B13)
L	As a project group you can report and present professionally, both verbally and in a report. [S7]
Μ	As a project group you deliver structured products and account for everyone's role within the project, the method followed and evaluate the process and the
N	product critically [S7]
0	You can report and present professionally, both verbally and in a report [S8]
	You deliver structured products, account for the method followed and evaluate the process and the product critically. [S8] Students can present their project, the content of their portfolio and their process considerations in a sound way making plausible the equal contribution of
Ρ	each project member to the project.
Q	
R	as a team you can communicate your research in an organized way, appropriate for the audience. Students are able to deliver a solid product demonstration to the stakeholders in which they demonstrate the product and address the main challenges and
n.	present a realistic roadmap.
7.4 (	Organize in a future-oriented way. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2
	ntext: structured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
L	Gives evidence that you are able to think ahead and plan ahead. You think methodically about the approach suitable for the assignment (identification of tasks,
	order of execution, proper prioritization) and how this contributes to the end result.
Μ	You plan and monitors the time. You are cost conscious. You recognize opportunities and risks. You can thereby all time aware of agreements, legal regulations
	and ethical standards.
N	You have a keen eye for the feasibility of duties in the organization. You taking into account the characteristics of the area of the assignment.
0	You examine where necessary and relevant to the ethical implications of the tasks you perform. You recognize their own and others' limits and act accordingly.
Р	You can construct achievable and realistic goals within the time available which contribute to solving a problem or achieving a demand. The goals can be divided into multiple related detailed tasks.
7.5 9	Solve problems in a research-oriented way. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level
	ontext: structured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
A	you can make a proposal for a sufficiently complex graduation assignment (B13)
В	you can draw up a graduation plan for a complex graduation assignment. (B14)
c	as a team you can deep dive in a new innovative technique/technology. Gaining knew knowledge by researching the way that is works and validate it by using
	an expert and reliable scientific resources.

	Gives evidence that your problems / challenges to identify and put in context (department / organization / business environment, social environment) and can
D	analyse these problems. You are able, where appropriate and relevant to search for multiple solutions.
Е	Throughout the dissolution process you're curious, ask yourself if from different perspectives. You are pragmatically, creatively and critically and make if appropriate use of resources.
-	You can make a thoughtful and methodical choosing the correct / most appropriate / suitable solution or approach. While you are critical about your own basis
F	and used arguments.
L. Use	r interaction
1.1	analyse
В	You describe the important consequences for UX based on a target group analysis [B5] & [B6].
1.2	Design
В	You describe UX test strategies suitable for a given situation [B5].
1.3	Realise
А	You can apply design guidelines and corporate branding when realising a simple interaction within an information system [B3].
в	You can realise a simple interaction within a team while taking into account consistency and standards [B3].
с	You can help a user with preventing, recognising and solving erroneous actions in a consistent manner within a team [B4].
D	You can help a user with recognising and solving erroneous actions [B4].
E	You can apply standards and internal consistency when developing more complex functions within an application [B4].
ĸ	You describe the correct implementation of UX design choices [B5].
L	You write a UX report accounting for design choices based on guidelines, human factors and/or emotional design [B6].
M	You test the UX of a product in a UX test report to evaluate the quality [B6].
N	You recommend further development steps based on the UX test report [B6].
_	Advise
<u>1.</u> 4	You can draw up a datavision goal based on the project context and business goal taking into account the goal, the target group and the message [B8].
В	You can make a sound choice for a datavisualisation type suitable for the datavisualisation goal [B8].
c	You can make a sound choice for visual elements suitable for the datavisualisation goal [B8].
D	You can realise a datavisualisation based on sound research [B8].
	ranization processes
_	analyse
A	Map, according to the given methodolody, the current situation of a singular company process (IST) [B3].
в	Analyse the performance of an organization through a standard methodology [B7].
с	Map an organization process of an existing organization by using suitable methodologies [B7].
D	You assess a given situation on various security aspects [B7].
Е	You understand the importance of a sound BI report (B14).
F	You understand what the necessity of BI is for companies (B14).
G	You can independently make a validated process analysis for an ICT provision in the context of an internship [INTERNSHIP BIC].
н	You clarify the company's current situation through coordinated KPIs and an obtained data set and you make an inventory of where the company can still take
	steps for improvement. Taking into account improvements in, among other things, new technologies [S7].
1	You map the branch and the company and you analyse how the process contributes to the company's goals [B7].
J	You can independently make a validated process analysis (IST) for the ICT provisions in a complex context [S8].
К	Students are capable of understanding the need for business to embrace data and can report what their maturity in this field is [B7].
2.2	Design
А	Describe, according to a given methodology, a design for an improved company process through ICT (soll) [B3].
В	You can map sound change strategies, so that you can choose the right strategy for the right change/company in a methodical way (B13).
С	You understand the ETL and the matching report process (B14).
D	You can independently make a validated process design and understand the relationship with the information provision in the context of an internship [INTERNSHIP BIC].
E	You analyse the IST of the processes within the company and you come up with realistic improvement proposals based on the various models and your own vision (SOLL) [S7].
F	You can independently make a validated and considered process design (SOLL) in a complex context [S8].
2.3	Realise
А	You create KPIs for a dataset that you substantiate yourself and create a matching BI report (B14).
В	You carry out the entire process from importing the data to creating the report (B14).
С	You realise and evaluate an implementation (plan) based on your own design, so the company has a ready made plan to follow through with the implementation of the changes [S7].
D	You describe (and carry out if possible) a relevant change management method and strategy in which you help the employees with the changes they are about to encounter so that you can help resolve possible resistance [S7].
Е	You independently realise an implementation(plan) and test the acceptance in a complex context [S8].
2.4	Advise

B         Two an independently give thorough organizational advice by using LCT possibilities in the context of an internability (INTERNAPI BIC).           Voc an independently give thorough organizational advice by using LCT possibilities in a complex context [SB].         Statusts understands how a companies data maturity fils in a broader context of data strategy [SB].           Image S. Control         Stadents strates and was about the forum perspective of data data from business [BG].           Image S. Control         More can independently data was an anagement plan for ICT processes in a niternabic context according to a chosen framework, taking into account updating, design, maintenance and quality assurance [ST].           Image S. Control         More can independently draw up a control plan for ICT processes in a complex context [SS].           Image S. Control         More can independently draw up a control plan for ICT processes in a complex context [SS].           Image S. Control         More company processes and ensure that they grow with the company or thut there is a plan with which these processes are kept up to data strategy [SS].           Image S. Control         More company processes and ensure that they grow with the company or that there is a plan with which these processes are kept up to data strategy [SS].           Image S. Control         More analysis         More analysis         More analysis           A The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions [SS].         More analysis a coffware system based on a framework for users in a	А	You submit a sound analysis report based on a company organization analysis [B7].
<ul> <li>values in a vell-argued manner the best option for change based on your own vision/cree values, a theoretical change model and the core values company (S).</li> <li>value an independently give a sound organizational advice for implementing ICT possibilities in a complex context [58].</li> <li>Students can advise about the future perspective of data after por sourcest of data strategy [68].</li> <li>Students can advise about the future perspective of data after por context of data strategy [68].</li> <li>Students can advise about the future perspective of data after por context of data strategy [68].</li> <li>Students can advise about the future perspective of data after por context of data strategy [68].</li> <li>Value an independently draw up a management plan for ICT processes in an internable context according to a chosen framework, taking into account to design, maintennace and quality assurance [107].</li> <li>Value an independently draw up a control plan for ICT processes in a complex context [58].</li> <li>Intratacture</li> <li>Jamaiye</li> <li>The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions [88].</li> <li>Make available a software system based on a Framework for users in a simple hosting environment [84].</li> <li>Make available a software system based on a Framework for users in a simple hosting environment [84].</li> <li>Statemate in an advise for a given project, the tis thould be adapted to be able to use the functionalities of a cloud provider [88].</li> <li>Statemate in an aller and employ and react accordingly on the generated metrics for a cloud application control tools [88].</li> <li>Statemate in a system to context for a system to be developed [83].</li> <li>Statemate in a strategy and angle system context of a system to be developed scoreling to a standard method [62].</li> <li>You core mathet by system context of a system to b</li></ul>		
<ul> <li>company [57].</li> <li>Vox can independently give a sound organizational advice for implementing [CT possibilities in a complex context [58].</li> <li>Students and/eshabut the future perspective of data and advient business [86].</li> <li>Stange &amp; Controll</li> <li>Tox can independently davu pa management plus for ICT processes in a niternahip context according to a chosen framework, taking into account u data given business [86].</li> <li>Tox can independently davu pa management plus for ICT processes in a niternahip context according to a chosen framework, taking into account u data given maintenance and quality assurance [INTERNSHIP BIC].</li> <li>Tox manage accient, updating, design, maintenance and quality assurance [S7].</li> <li>You can independently draw up a control plun for ICT processes in a complex context [S8].</li> <li>Intrastructure</li> <li>Ta analyte</li> <li>Za esign</li> <li>Ta analyte</li> <li>Za esign</li> <li>Ta analyte</li> <li>Za esign</li> <li>Ta busite a context quality assurance [S7].</li> <li>You can independently draw up a control plun for ICT processes in a complex context [S8].</li> <li>The student can design a solution for a given project, making user of a cloud provider and taking into account the given preconditions [88].</li> <li>Za basite</li> <li>The student can advise for a given project making users in a simple hosting environment [84].</li> <li>The student can advise for a given project making users in a simple hosting environment [84].</li> <li>The student can advise for a given project mow it should be adapted to be able to use the functionalities of a cloud provider [88].</li> <li>Software</li> <li>Ta student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [88].</li> <li>Ta student can advise for a system to be developed [31].</li> <li>Tox dual provide the systems context of a system to be dev</li></ul>		
<ul> <li>Do vari independently give a sound organizational advector implementing ICT possibilities in a complex context [S8].</li> <li>Students can advect and by the project for a data driven business [B6].</li> <li>Students can advect and by the project for a data driven business [B6].</li> <li>Students can advect and advect and provident the provemit the company or that there is a plan with which these processes are kept up to data driven business [B6].</li> <li>Toru anning degradment plan for ICT processes in an internable context according to a chosen framework, taking into account up datating, degra, maintenance and quality assurance [S7].</li> <li>To anning degradment plan for ICT processes in a complex context [S8].</li> <li>Intrastructure</li> <li>To account degradment plan for ICT processes in a complex context [S8].</li> <li>Intrastructure</li> <li>Ta advec</li> <li>To account degrad a solution for a given project, making use of a cloud provider and taking into account the given preconditions [B8].</li> <li>The student can advise for a given project, making use of a cloud provider and taking into account the given preconditions [B8].</li> <li>Advise</li> <li>The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].</li> <li>Students and advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].</li> <li>The student can select and employ and react accordingly on the generated metrics for a cloud application control tools [B8].</li> <li>The student can select and employ ad react accordingly on the generated metrics for a cloud application control tools [B8].</li> <li>Toru degradment given and the system context of a system to be developed [B3].</li> <li>Toru degradment given and the system context of a system to be developed according to a studard metha functional gespective to formulate and documen</li></ul>	C	
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25         Stange & Control           A         You can independently draw up a management plan for ICT processes in an internship context according to a chosen framework, taking into account u design, maintenance and quality assurance [NTERNSHIP BK].           C         You can independently draw up a control plan for ICT processes in a complex context [S8].           Infrastructure         Status           31 analyse         32 design           32 design         Status           A         The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions [B8].           33 analyse         33 enalyse           32 design         The student can devise for a given project, making use of a cloud provider and taking into account the given preconditions [B8].           34 Make available a software system based on a Framework for users in a simple hosting environment [84].           34 Matine         The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].           54 Make         The student can advise for a given project making user advise for a cloud application control tools [B8].           54 Individually you collect relevant data form one give project making environment [84].           34 Make         Individually ou interpret collected data from the functional perspective to formulate and document requirements according to given standard method [83].           6 (forup) you determine		
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c       Yeu can independently draw up a control plan for ICT processes in a complex context [58].         Interstructure       31 analyse         32 design       The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions [88].         33 Healiee       The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [88].         34 Advise       The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [88].         35 Wansge & Control       A         A       The student can select and employ and react accordingly on the generated metrics for a cloud application control tools [88].         55 Wansge & Control       In student can select and employ and react accordingly on the generated metrics for a cloud application control tools [88].         61 (individually) you cletermine the systems context of a system to be developed [183].       Individually you cletertine from the functional perspective to formulate and document requirements according to given standard methor furtual inaquage [38].         7 Vuo cells circle data form one single requirement's source through a given elicitation technique [184].         8 Vuo can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIPS].         9 Vuo can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIPS].         9 Vuo can independently make a	В	
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3.3 Realise         A         Make available a software system based on a Framework for users in a simple hosting environment [B4].         3.4 Advise         A         The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].         3.5 Manage & Control         A       The student can select and employ and react accordingly on the generated metrics for a cloud application control tools [B8].         .5oftware         4.1 analyse         A       (Group) you determine the systems context of a system to be developed [B3].         (Individually you collect relevant data from one single requirement's source through a given elicitation technique [B3].         (Individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3].         (Individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3].         (Individually) you collect data from one single requirement's source through a given elicitation technique [B3].         (Individually) you tomptot collected data from one single requirement's source through a given elicitation requirements according to a standard method [B2].         You collect information so as to formulate functional requirements for a system to be developed according to a standard method [B2].         You collect information so as to formulate functional requirement (B41).         You contindependenty ma	3.2	
A       Make available a software system based on a Framework for users in a simple hosting environment [B4].         3.4 Advise       The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].         3.5 Manage & Control       The student can advise for a given project how it should be adapted to be able to use the functionalities of a cloud provider [B8].         3.6 Manage & Control       The student can advise for a given project how it should be adapted to be able to use the functional paper.         4.1 analyse       Individuality you callect relevant data from one single requirement's source through a given elicitation technique [B3].         Individuality you callect relevant data from one single requirement's source through a given elicitation technique [B3].         Individuality you interpret collected data from the functional perspective to formulate and document requirements according to given standard meth natural language [B3].         Powelop acceptation criteria for a user story [B4].       You determine the System of the Systems context for a system to be developed with one interested party [B4].         V Ou can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].       You can validate the formulated specifications and pirconditions, in which at least maintenance and manageability are included in the loca infrastructure and development processes [S1].         V Ou can validate the formulated specifications and preconditions, in which at least maintenance and manageability are included in the loca infrastructure and development process. F	А	The student can design a solution for a given project, making use of a cloud provider and taking into account the given preconditions [B8].
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Software       4.1 analyse         4.1 analyse       [Group) you determine the systems context of a system to be developed [B3].         [Individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3].         [Individually) you interpret collected data from the functional perspective to formulate and document requirements according to given standard meth natural language [B3].         Develop acceptation criteria for a user story [B4].         You determine the System and the Systems context for a system to be developed with one interested party [B4].         You can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].         You can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].         You can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].         You can validate the formulated specifications and preconditions, in which at least maintenance and manageability are included in the local infrastructure and development processes [S7].         You can validate the formulated specifications and preconditions and preconditions [S7].         You can validate the formulated specifications and preconditions and preconditions [S1].         You develop empathy for stakeholders to determine their challenges [B5].         You develop a prototype based on a validated idea [B5].         You develop a prototype based on a valididate idea [B5].	3.5	Manage & Control
<ul> <li>4.1 analyse</li> <li>A (Group) you determine the systems context of a system to be developed [B3].</li> <li>(Individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3].</li> <li>(Individually) you interpret collected data from the functional perspective to formulate and document requirements according to given standard methen tarural language [B3].</li> <li>Develop acceptation criteria for a user story [B4].</li> <li>You collect informations so as to formulate functional requirements for a system to be developed according to a standard method [B2].</li> <li>You collect information so as to formulate functional requirements for a system to be developed according to a standard method [B2].</li> <li>You can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].</li> <li>You describe functional and quality specifications and limiting preconditions, in which at least maintenance and manageability are included in the loca infrastructure and development processes [S7].</li> <li>You can validate the formulated specifications and preconditions, and thus assess the degree of completeness and objectivity [S7].</li> <li>You can validate the formulated specifications and problem in a complex context [S8].</li> <li>You develop empathy for stakeholders to determine their chalenges [B5].</li> <li>You develop a protytype based on a validated idea [B5].</li> <li>You develop a protytype based on a validated idea [B5].</li> <li>You can make a functional design of a simple function of a system yet to be developed, and document it through a standard modelling technique [B3].</li> <li>You can make a technical design of a simple function of a system yet to be developed, and document it through a standard modelling technique [B3].</li> <li>You can make a technical design of a simple function of a system yet to be developed, and document it through a standard modelling technique [B3].</li> <li>You can make a t</li></ul>	А	The student can select and employ and react accordingly on the generated metrics for a cloud application control tools [B8].
<ul> <li>A (Group) you determine the systems context of a system to be developed [B3].</li> <li>A (Group) you collect relevant data from one single requirement's source through a given elicitation technique [B3].</li> <li>C (Individually) you interpret collected data from the functional perspective to formulate and document requirements according to given standard meth natural language [B3].</li> <li>D Develop acceptation criteria for a user story [B4].</li> <li>You collect information so as to formulate functional requirements for a system to be developed according to a standard method [B2].</li> <li>You can map the trust boundaries of a complex system (B14).</li> <li>You can map the trust boundaries of a complex system (B14).</li> <li>You can independently make an analysis of a software engineering design problem in an internship context [INTERNSHIP SE].</li> <li>You can validate the formulated specifications and limiting preconditions, in which at least maintenance and manageability are included in the loca infrastructure and development processes [57].</li> <li>You can validate the formulated specifications and preconditions and preconditions [57].</li> <li>You can validate the formulated specifications and preconditions and precondition of software.</li> <li>You independently make an analysis of a software engineering design problem in a complex context [S8].</li> <li>You develop empathy for stakeholders to determine their challenges [B5].</li> <li>You develop a prototype based on a defined problem [B5].</li> <li>You design a database of a simple information system and document this by means a standard modelling technique [B3].</li> <li>You can make a functional design of a simple function of a system syst to be developed, and document it through a standard modelling technique [B3].</li> <li>You can validate discription of (the internal) structure and working of an Object Oriented information system [B2].</li> <li>You can make a techni</li></ul>	. Soft	tware
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<ul> <li>T You develop empathy for stakeholders to determine their challenges [B5].</li> <li>U You create innovative ideas based on a defined problem [B5].</li> <li>V You develop a prototype based on a validated idea [B5].</li> <li>W You test the prototype extensively to come up with new insights [B5].</li> <li>4.2 design</li> <li>A You design a database of a simple information system and document this by means a standard modelling technique [B3].</li> <li>B You can make a functional design of a simple function of a system yet to be developed, and document it through a standard modelling technique [B3].</li> <li>C You can make a technical design of a simple function of a system as yet to be developed, and document it be means of a standard modelling technique [B3].</li> <li>C You communicate more complex concepts and designs univocally with the professional field [B4].</li> <li>E You write a technical description of (the internal) structure and working of an Object Oriented information system [B2].</li> <li>F You can solve a problem occurring in the market and involve the right stakeholders [B6].</li> <li>G You generate new insights by translating a solution into an MVP, test it, and analyse the metrics (results) [B6].</li> <li>I You make a first overview of a business model [B6].</li> <li>J You describe the needs of the users of the software system to be developed [B6].</li> <li>K You draw up a functional design for a complex part of a software system [B6].</li> <li>L You determine the quality of the design, for example through testing or prototyping, taking into account the formulated quality characteristics (ISO 25 M You demonstrate the success of the solution in an organized way through metrics developed [B6].</li> </ul>	R	You can thoroughly describe a technical and/or process-related problem concerning the production of software.
<ul> <li>T You develop empathy for stakeholders to determine their challenges [B5].</li> <li>U You create innovative ideas based on a defined problem [B5].</li> <li>V You develop a prototype based on a validated idea [B5].</li> <li>W You test the prototype extensively to come up with new insights [B5].</li> <li>4.2 design</li> <li>A You design a database of a simple information system and document this by means a standard modelling technique [B3].</li> <li>B You can make a functional design of a simple function of a system yet to be developed, and document it through a standard modelling technique [B3].</li> <li>C You can make a technical design of a simple function of a system as yet to be developed, and document it be means of a standard modelling technique [B3].</li> <li>C You communicate more complex concepts and designs univocally with the professional field [B4].</li> <li>E You write a technical description of (the internal) structure and working of an Object Oriented information system [B2].</li> <li>F You can solve a problem occurring in the market and involve the right stakeholders [B6].</li> <li>G You generate new insights by translating a solution into an MVP, test it, and analyse the metrics (results) [B6].</li> <li>I You make a first overview of a business model [B6].</li> <li>J You describe the needs of the users of the software system to be developed [B6].</li> <li>K You draw up a functional design for a complex part of a software system [B6].</li> <li>L You determine the quality of the design, for example through testing or prototyping, taking into account the formulated quality characteristics (ISO 25 M You demonstrate the success of the solution in an organized way through metrics developed [B6].</li> </ul>	S	You independently make an analysis of a software engineering design problem in a complex context [S8].
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M You demonstrate the success of the solution in an organized way through metrics developed [B6].		
	N	You write a techspecs report as reference that can be transferred to third parties [B6].
O You recognise and explain with which programming techniques you can solve certain software problems (B13).	0	You recognise and explain with which programming techniques you can solve certain software problems (B13).

Р	You can independently select, document, communicate and evaluate solutions for a software engineering design problem in an internship context using tests
	and prototypes [INTERSHIP SE].
Q	You evaluate solutions based on the stated specifications and limitations (consistency) using tests, prototypes and comparable techniques. In addition, you analyse data collected with qualitative and/or quantitative analysis techniques [S7].
R	You select candidate solutions based on relevant, current and specialist professional knowledge from the ICT domain [S7].
S	You apply appropriate schematic techniques in the document where possible, which are in line with the chosen design strategy and goaled at the target group,
3	which in any case consists of developers who (further) develop the product [S7].
Т	You can independently select, evaluate (partial), document and communicate solutions for a software engineering design problem in a complex context [S8].
U	You can create measurable non-functional requirements for a given system [B5].
V	You can design a substantiated architecture of a software system [B5].
W	You can derive and interpret performance metrics for a given system [B5].
4.3	Realise
А	You can realise a simple function within given concepts of a Framework [B3].
В	You can test a software system based on a Framework on the own work environment [B3].
С	Deliver Code that is acceptable for a production environment [B4].
D	Within a given framework context apply a more complex concept [B4].
Е	Within a given organization and framework context develop an innovation [B4].
F	You apply Object Oriented programming concepts to realise functionality [B2].
G	You apply programming concepts to realise functionality (Miller: 1. prescriptive, 2. applying) [B1] [B2].
н	You write readable, well-organized code (Miller: 1. prescriptive, 2. applying) [B1] [B2].
	You make robust code (Miller: 1. prescriptive, 2. applying) [B1] [B2].
J	Indicate for a given code example/class diagram which design patterns were applied [B5].
К	Apply a suitable design pattern for a given situation and work it out in both a class diagram and actual code [B5].
L	Recognise weak points in code, so-called code smells, and apply an appropriate standardised remedy, so-called refactoring [B5].
М	You apply the right combination of programming techniques for the problems in a complex software system (B13).
Ν	You perform a security audit through a given model (B14).
0	You can independently realise a suitable solution for a software engineering design problem in an internship context [INTERNSHIP SE].
Р	You realise (prototypes of) a system existing of several sub systems and/or existing components [S7].
Q	You can do research into the quality of the realised software such as functionality, security and performance [S7].
R	You independently realise a suitable solution to a software engineering design problem in a complex context, independently [S8].
S	You can implement a component for a given architecture [B5].
4.4	Advise
А	You can independently give a suitable advice for solving a software engineering design problem in an internship context [INTERNSHIP SE].
в	You write a suitable advice on the results of a security research that was held (B14).
с	You explain the results of the security audit according to a model (B14).
D	You advise the customer on a solution for a software problem, convince the customer that the solution is in line with his/her objective and vision and you
	support the customer in the implementation of the solution or you give you process-oriented advice [S7].
Е	You independently give a suitable advice for solving a software engineering design problem in a complex context [S8].
4.5	Manage & Control
А	You can organize and use tools to exchange code and documentation within a team [B3].
в	Use the project tools to improve the process of analysis, design, realization, testing and making functions available in an application [B4].
с	You can set up an environment on your working environment using virtualization and use it to test code [B3].
D	You set up (generic) servers to make an application available [B4].
E	yYou use containerisation to make an application available and modify it [B4].
F	Master the advanced features of the distributed version control system (DVCS) Git to enable effective collaboration on a software project [B5].
G	Achieve manageability of your software project releases by choosing a branching model and corresponding workflow [B5].
н	Design a deployment pipeline that runs an existing open source software application and generates an automatic build [B5].
	Proof your solution by performing a complete release from a change in code that generates corresponding executables executing all the steps of a release
	management cycle [B5].
J	Guarantee software quality by enabling quality tools and executing unit tests [B5].
ĸ	You ensure confidentiality of a data set by applying cryptography [B7].
	dware Interfacing
1	analyse
<u>э.т</u> А	You describe the foundations of a computer system [B1].
	a Science (Cisp-DM Cycle)
-	
	You set up a data Science process
	SP-DM phase(s): Business Understanding + Data Understanding
A	You can define and report the customers organisation and its problem [B7].
В	You can define & provide data mining goals [B7].
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С	You can define business objectives and are aware of the need of information by the business [B7].
D	You can collect provided data sets and make them usable for the data science process [B7].
E	You describe collected and needed data by data types and metadata [B7].
F	You define data mining goals success criteria [B8].
G	You describe data mining activities based on choice of a basic machine learning model and relevant required activities [B8].
н	You add extra self-organised and/or external data sources to the data science process [B8].
1	You can compose a data management plan for a specific project, taking in account all facets of a given, recognised standard (B14).
J	You describe data mining activities based on choice of the best applicable machine learning model and relevant required activities [S7].
К	You can independently set up a data science process in an internship context [INTERNSHIP DS].
L	You can independently set up a data science process in a complex context [S8].
6.2	You collect and address relevant data
CRI	SP-DM phase(s): Data Understanding + Data Preparation
А	You generate basic statistics summaries exploring data [B7].
В	You create a basic quality description to validate relevant data [B7].
с	You will exclude/include rows & columns to select relevant data [B7].
D	You clean data in order to achieve correct data types and handle missing values [B7].
Е	You will perform basic feature extraction to construct correct and usable data [B7].
F	You are capable of converting data in correct formats to visualize data [B7].
G	You (re-)validate data after model generated assumptions [B8].
н	You clean data by imputating and scaling revelant data [B8].
1	You construct data by one-hot-encoding, defining targets & labelling relevant data [B8].
J	You integrate relevant data by merging multiple data sources [B8].
ĸ	You convert data formats as prerequisite for relevant model(s) [B8].
L	You validate data through statistical testing [S7].
M	You imputate relevant values to the chosen data to substitute missing values [S7].
N	You construct data by feature extracting (aggregates, target encoding) and/or unstructured data [S7].
0	You integrate relevant data by merging & joining across multiple levels [S7].
P	You convert data formats using sparse representation and include useful generators to enhance performance of your techniques [S7].
Q	You independently collect and address relevant data in an internship context [INTERNSHIP DS].
R	You independently collect and address relevant data in a complex context [S8].
_	You perform data analysis
	SP-DM phase(s): Modelling
A	You define metrics, independent records, & targets to generate a test design [B7].
В	You build the model and benchmark the predictions with basic statistic tooling [B7].
C	You assess relevant model(s) by the chosen metric [B7].
D	You split data into test & train sets to generate a test design [B8].
E	You build & train relevant model(s) and create predictions using the model(s) on test data set [B8].
F	You assess the model(s) on chosen metrics of the defined success criteria [B8].
G	You define a test design using cross validation & time splits [S7].
н	You build a model taking feature selection, model tuning, bias, variance over/under fitting & learning curves into account [S7].
1	You asses your model outcome using advanced metrics and graphical aids [S7].
J	You can independently perform data analysis in an internship context [INTERNSHIP DS].
ĸ	You can independently perform data analysis in a complex context [S8].
	You evaluate & deploy results of the data science process
	SP-DM phase(s): Evaluation + Deployment
A	You summarise and evaluate results with business objective(s) [B7].
В	You set up a list of actions to determine following steps [B7].
c	You produce a final report and present this to customer [B7].
D	You review the data science process and you determine, and also report, lessons learned [B7].
E	You evaluate and match success criteria with business objectives of the data science process [B8].
F	You determine next steps and setup an advisory report for follow-up [B8].
G	You produce a deliverable for customer [B8].
H	You review the data science process and collect lessons learned on process & product [B8].
	You determine the next steps in an additional data science process cycle providing a conclusion supplemented with recommendations [S7].
ı J	You advice the business successively implementing the data science process by a plan [S7].
J K	You can independently evaluate and deploy results of a data science process in an internship context [INTERNSHIP DS].
κ L	You can independently evaluate and deploy results of a data science process in a ninternship context [NPERNSHIP DS].
	fessional Skills

7.1	Professional Skills
Μ	You can employ the right professional skills to complete a project successfully in a complex environment [S7].
Ν	You account for the choices made regarding the professional skills employed [S7].
0	You can independently in a complex environment employ the right professional skills to complete a project successfully (S8).
Ρ	You account for the choices made regarding the professional skills employed (S8).
Q	You can function professionally in a company-related, ICT-related environment [INTERNSHIP].
	show personal leadership. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2 (Context: ctured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
D	You form an ethical opinion on a security-related case, taking into account the opinions of people who may think differently [B7].
К	You can create a website as introduction to the program, include your motivation and show that you improve the website based on received feedback. Leading
	to a website that is improved in quality and attractiveness [B1].
L	Developing skills and behaviour to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals, community goals and personal goals.
Μ	Developing skills and behaviour to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals through participation in a project week.
Ν	Developing skills and behaviour to achieve personal and professional goals. Carrying out activities that contribute to personal goals through participation in an international week.
0	You're considerate, see opportunities and seize them. You have a proactive attitude that you take initiative and feel responsible for what you do.
Ρ	You can motivate yourself and others, you are willing to help others / support (individual and team). You can present yourself or a team, take others into your own development.
Q	You study demonstrates considered, strengthens your own learning and can recognize a learning need in yourself and mating act, reflect, evaluate, and give active feedback questions. You recognize when you need help and do it then.
R	You can specify what type of professional you want to be and / or what type of positions you aspire, know your own strengths and weaknesses and can describe yourself well.
	Interact purposefully. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2 (Context: ctured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
А	You read IT-oriented English literature on HBO entrance and can extract the necessary knowledge from it .
В	You write IT-related English documentation on HBO entrance level, suitable for the message you want to convey and aimed at the target group.
С	You focus on the various groups of stakeholders such as partners, interest groups, individual team members etc.
D	You focus on what you want to communicate and what purpose you choose the most appropriate form and while you perform this proactively.
E	You focus on your role in the context of the ICT job, you recognize these tasks and takes proactive. You dare others to speak (feedback) and are open to feedback. You are open to other opinions / views / arguments and see that as an enrichment. You consciously build confidence in an interdisciplinary and intercultural cooperation context.
F	You have mastered the Dutch (for Dutch track) or the English (for English and Dutch track) language in writing on level 3F (B2) (conditionally and thus tick-off test within the course).
Н	You can read English for orientation (B2/C1).
1	You can write formal English texts (B2/C1).
J	You can give in English a verbal presentation.
К	You can communicate in a sound way with various departments within a company, taking into account hierarchical layers (B13).
L	As a project group you can report and present professionally, both verbally and in a report [S7].
Μ	As a project group you deliver structured products and account for everyone's role within the project, the method followed and evaluate the process and the product critically [S7].
Ν	You can report and present professionally, both verbally and in a report [S8].
0	You deliver structured products, account for the method followed and evaluate the process and the product critically [S8].
Ρ	Students can present their project, the content of their portfolio and their process considerations in a sound way making plausible the equal contribution of each project member to the project.
Q	As a team you can communicate your research in an organized way, appropriate for the audience.
R	Students are able to deliver a solid product demonstration to the stakeholders in which they demonstrate the product and address the main challenges and present a realistic roadmap.
	Organize in a future-oriented way. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2
	ntext: structured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).
L	Gives evidence that you are able to think ahead and plan ahead. You think methodically about the approach suitable for the assignment (identification of tasks, order of execution, proper prioritization) and how this contributes to the end result.
М	You plan and monitor the time. You are cost conscious. You recognize opportunities and risks. You can thereby all time aware of agreements, legal regulations and ethical standards.
N	You have a keen eye for the feasibility of duties in the organization. You take into account the characteristics of the area of the assignment.
0	You examine where necessary and relevant to the ethical implications of the tasks you perform. You recognize your own and others' limits and act accordingly.
Ρ	You can construct achievable and realistic goals within the time available which contribute to solving a problem or achieving a demand. The goals can be divided into multiple related detailed tasks.
7.5	Solve problems in a research-oriented way. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level
2 (C	ontext: structured, unpredictable problem known solution space limited Contents: Several basic concepts and some in-depth concepts).

- A You can make a proposal for a sufficiently complex graduation assignment (B13).
- B You can draw up a graduation plan for a complex graduation assignment (B14).

C As a team you can deep dive in a new innovative technique/technology. Gaining knew knowledge by researching the way that it works and validate it by using an expert and reliable scientific resource.

Gives evidence that your problems / challenges to identify and put in context (department / organization / business environment, social environment) and can analyse these problems. You are able, where appropriate and relevant to search for multiple solutions.
 Throughout the dissolution process you're curious, ask yourself if from different perspectives. You are pragmatically, creatively and critically and make if appropriate use of resources.

You can make a thoughtful and methodical choosing the correct / most appropriate / suitable solution or approach. While you are critical about your own basis and used arguments.

# 2.2.3 Programme structure (article 3.3, 3.11a en 3.13 CER HZ ba ft)

National name:	B HBO-ICT
International name:	B Information & Communication Technology
Orientation:	Bachelor
Title conferred:	HBO-ICT
Programme duration:	240 study credits (ECTS)
Course workload 'propaedeutic' phase:	60 study credits (ECTS)
Conclusion with 'propaedeutic' examination:	Yes
Course workload main phase:	180 study credits (ECTS)
Variant:	Full-time
ISAT code:	30020
Location:	Middelburg
Language:	Dutch & English
Effective date:	29-06-2018
Submission date	01-11-2024
Joint degree programme:	Not applicable
180 ECTS fast track:	No

### Course structure of the programme

### **PROPAEDEUTIC PHASE (YEAR 1)**

#### Personality 2.5 EC



#### MAIN PHASE

#### YEAR 2



### HBO-ICT Bachelor programme - full-time

### YEAR 3



### YEAR 4



### 2.2.3a Transfer with an Associate Degree certificate (article 3.3 paragraph 4 sub I CER HZ ba ft)

#### This article is specifically written in Dutch because AD students can only choose the Dutch track.

Toelating van studenten met een Ad getuigschrift: Studenten met een getuigschrift Ad Informatica (Isat80075) uitgereikt door Avans Hogeschool (Brin 07GR), vestigingsplaats Roosendaal, zijn direct toelaatbaar. Tevens mogen deze studenten zich in het eerste jaar van inschrijving inschrijven voor de postpropedeutische fase van de opleiding. Het instellingsbestuur verleent hen daartoe vrijstelling van de eis in het bezit te zijn van een getuigschrift van het met goed gevolg afgelegde propedeutisch examen (via WHW art. 7.30 lid 2). De examencommissie verleent studenten met dit getuigschrift op individuele basis vrijstelling voor het afleggen van de tentamens waarvan de examencommissie voorafgaande aan het eerste jaar van inschrijven aan de hand van een programmavergelijking heeft kunnen vaststellen dat de student beschikt over de kennis, inzicht en vaardigheden op het niveau waarnaar via die tentamens onderzoek gedaan wordt. De studenten dienen daartoe conform OER (Bachelor en Experiment Leeruitkomsten) artikel 4.6 en artikel 4.5 OER (Associate Degrees) om die vrijstellingen te verzoeken. Het voorgaande geldt niet voor studenten met een getuigschrift Ad Informatica uitgereikt door andere hogescholen dan genoemde en ook niet voor studenten met een Ad getuigschrift van een andere opleiding dan Ad Informatica.

#### English translation, informative:

Admission of students with an Ad certificate: Students with an Ad certificate in Computer Science (Isat80075) issued by Avans University of Applied Sciences (Brin 07GR), location Roosendaal, the Netherlands, are directly entitled to admission. These students may also enrol in the post-propaedeutic phase of the programme in their first year of enrolment. The board of the institution grants them exemption from the requirement to be in possession of a certificate of successful completion of the propaedeutic examination (via WHW article 7.30 paragraph 2). The board of examiners grants exemption to students with this certificate on an individual basis from taking examinations for which the board of examiners has established, prior to the first year of enrolment, by means of a programme comparison, that the student has the knowledge, insight and skills at the level that is being examined in these examinations. To this end, students must request such exemptions in accordance with OER (Bachelor's and Experiment Learning Outcomes) article 4.6 and article 4.5 OER (Associate Degrees). The above does not apply to students with an Ad diploma in Computer Science issued by other universities than the ones mentioned above, nor to students with an Ad diploma from a programme other than Ad.

# 2.2.3b Language

The study programme adheres to the following rules regarding language.

### Placement

In the beginning of the first period in year 1, all first year students will take a placement test. This test will define whether a student will join the B2 or C1 class by the Language Competence Centre (LCC). The entire course will be provided by the LCC, including tests. When a student passes the LCC course, this will ensure the language test of course PPD-E (CU75068 for INT and CU75079 for NL) is set to Passed. The obtained level will be noted on the diploma or handed separately. Furthermore, students can choose to sign up for the level C2 trying to achieve the proficiency level. Moreover, students can individually apply for an official test by Cambridge on their own initiative and payment. Agreements can be made directly with the LCC.

### Exemption

All students that own a certificate no more than 3 years old and has at least a B score of a B2 certificate or otherwise a grade of 7 or higher on an IELTS test, may apply for exemption. The LCC will give out an advice on the intended exemption, which will be handled by the examination board and granted or not. The procedure will be handled by the LCC. As soon as exemption is granted, this will set the language test of PPD-E (CU75068 for INT and CU75079 for NL) to Passed.

### First semester of the first year

Lessons and tests of the theoretical part will take place in two separate groups, Dutch and English. As an exception, collective meetings will be organised (in English), for instance by guest speakers. Dutch students are allowed to follow classes in English on a voluntary basis.

All the material will be in English. For ICT much of the material has always been in English and MBO/HAVO reading level English of starting students is sufficient.

### Second semester of the first year

Lessons will take place in one mixed or separate groups and the common language is English. Written or digital tests will take place in two separate groups, Dutch and English. All individual assessments (such as portfolio or reports) are submitted in English or Dutch depending on which stream the student is in.

### First semester of the second year

Lessons will generally take place in separate groups both in Dutch and English. With an exception for Design thinking within UVE(CU75076V1) and the two electives; Software Design (SDE CU75020V2) and Data driven Business (CU75072V1) the language will be English. Written or digital tests will take place in two separate groups, Dutch and English with an exception on the above stated courses. All individual hand in tests (like portfolio or reports) are delivered in English or Dutch depending in which stream the student project group is.

### Second semester of the second year and on

As from Cohort 2020-2021 the second semester 2nd year and the whole of the 3rd and 4th year: The language of instruction and examining is English, except for the work placement / graduation phase at the request of the work placement company / company where the student complete their graduation. Cohorts up to and including 2019-2020 2nd, 3<sup>rd</sup> and 4th year: The language of instruction and examining is Dutch. Except for the work placement / graduation phase at the request of the work placement company / company where the student completes his graduation.

# 2.2.4 *Courses 'propedeuse' phase* (article 3.5, 3.11A CER HZ Ba ft)

Abbreviations used in the course tables:

- V Verbal exam
- W Written exam
- O Other test
- I Individual test
- G Group assessment
- BW Blockweek
- WD Working day
- CW Calendar week

Block 1 / Sem	ester :	1 – Co	mpute	er Scie	nce									
CU75001V3	Title:	Progra	1m- & C	Career	Oriento	ition (PCO)	Number o	of study credits: 2.5	5 Contact	hours: 56	Manda	atory: Yes T	eaching languag	ge: NL/ENG
Conditions for course participation: none														
Conditions for test participation: none														
Brief descriptio	Brief description of course content: Students are introduced to each other, the teachers, the programme and their career opportunities. Based on this knowledge students can, supported													
by examples and/or reflections, draw some conclusions for the rest of their own study. Students will start with hands on practice.														
Compulsory literature: none														
Test code	Form	at				Assessment type		Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
									Factor (%)	score	test in	of work in	scheduled	of resit in
	v	W	0	I	G						week	week	in week	week
TOETS01 (VT)	X	X	Х	X		Assessment website		7.2K	100%	5.5	BW 2 or 3	5 WD	BW 8 or 9	< 10
						(Individual process						before resit		workdays
						assessment)								

CU75002V2	Title:	Сотри	iter Sci	ence B	asics (C	CSB)	Number	of study credits: 5	Contact	hours: 45	Manda	tory: Yes	Teaching languag	e: NL/ENG
Conditions for a	Conditions for course participation: none													
Conditions for test participation: none														
Brief descriptio	Brief description of course content: Fundamental computer science concepts including definition, history, and working of computers; compilers; data structures; operating systems; and													
client-server ard	client-server architecture.													
Compulsory literature: none														
Test code	Form	at				Assessment type		Content	Weighting Factor (%)	Minimum score	Planning test in	Inspection of work in	Resit scheduled	Inspection of resit in
	v	w	0		G						week	week	in week	week
TOETS01 (VT)	V	X	0	X	0	Written knowledge t	oct	5.1A	100%	5.5	BW 8 or 9	5 WD	BW 10	< 10
10[130] (11)		Λ		Λ		written knowledge t	<b>C</b> 31	J.1A	100%	5.5	BW 8 01 9	before resi		< 10 workdays

CU75003V1	Title:	Progra	amming	Basic.	s (PBA)		Number	Number of study credits: 5 Contact hours: 36		Mand	atory: Yes	Teaching language: NL/EN		
Conditions for	course	partici	pation	none:										
Conditions for	Conditions for test participation: none													
Brief description	on of co	ourse co	ontent	Yourj	first ste	ps into programming.	You learn	subjects as: data st	tructures, co	nditionals, loops	, functions prob	olem solving a	nd algorithmic th	ninking.
Compulsory lit	erature	: none												
Test code	Form	at				Assessment type Content Weighting Minimum				Planning	Inspection	Resit	Inspection	
	v	W	0	I	G				Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X		X		Case study exam		4.3G, 4.3H, 4.3I	100%	5.5	BW 8 or 9	5 WD before resi	BW 10	< 10 workdays

CU75054V1	Title:	IT Pers	onality	Projec	ct Week	: 1 (PPW1)	Number of study credits: 1.25	Contact	hours: 36	Mandat No <sup>20</sup>	ory: T	eaching langua	ge: NL/ENG
										NO <sup>20</sup>			
Conditions for	course	partici	pation	none									
<b>Conditions for</b>	test pa	rticipat	t <b>ion:</b> no	one									
Brief descriptio	on of co	ourse co	ontent	This c	ourse ci	an be followed 3 times o	during the study programme. C	ourse descr	intion for CU75	5054. CU75058. (	and CU75075	are identical. I	Personality
-							es the skills concerning and att						
			•		•	,	5		•	•	•	• •	5
		-					culum. Each year the ICT progr	am organiz	es a project we	ek with real life	casus ana (If	possible) in coo	peration with
other program.	s. This µ	oroject	week c	ourse d	can be c	chosen as 1,25 ec conter	nt for personality.						
The assessmen	t criteri	ia and d	assessn	nent pr	ocess a	re listed in the IT Persor	nality 2021-2022 instruction ma	nual which	can be found o	on the Learn pag	ie.		
This course is a	Iready	approv	ed for I	T perso	onality,	students only need to d	efine their personal goals with	n the given	context.				
Compulsory lit	erature	e: none											
Test code	Form	at				Assessment type	Content W	/eighting	Minimum	Planning	Inspection	Resit	Inspection
			•				Fa	actor (%)	score	test in	of work in	scheduled	of resit in
	v	w	0	I	G					week	week	in week	
											week		week
													week
TOETS01 (VT)		X	X	X		Portfolio	7.2M	100%	P/NP <sup>21</sup>	CW 43 or 44	CW 47	CW 3	CW 5

 <sup>&</sup>lt;sup>20</sup> Mandatory: no, 2 out of 4 from CU75054, CU75055, CU75056, CU75057 (*Further information: see manual of personality on learn*)
 <sup>21</sup> P/NP stands for Passed/Not Passed.

CU75056V1	Title:	IT Pers	sonality	י 1 (ITP	1)		Number of study credits: 1.2	5 Contact	: <b>hours:</b> 36	Manda No <sup>22</sup>	tory: T	eaching langua	ge: NL/ENG
Conditions for	course	partici	pation	: none									
Conditions for	test pa	rticipat	tion: no	one									
A prerequisite ;	for star Person	ting the ality 20	e HZ Pe )21-202	rsonali	ity rela	ted activities is having	a broadening or a deepening fo obtained a GO from one of the found on the Learn page.				nt criteria and	assessment pro	cess are
Test code	Form	at				Assessment type	Content N	Veighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G		, i i i i i i i i i i i i i i i i i i i	actor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X	X	X		Portfolio	7.2M	100%	P/NP <sup>23</sup>	CW 43 or 44 or 45 or 46	CW 47	CW 3	CW 5

Block 2 / Sem	ester	1 – Ga	me De	evelop	ment								
CU75004V1	Title:	: Object	:-Orien	ted pro	gramn	ning (OOP)	Number of study credits: 10 Contact hours: 70			Mand	Mandatory: Yes Teaching language: NL/EN		
Conditions for course participation: none													
Conditions for test participation: none													
Brief description of course content: You apply the object-oriented principles: abstraction, encapsulation, inheritance and polymorphism. First, we cover the theory then we move on to a practical assignment for a regional client.													
Compulsory lit	erature	e: none											
Test code	Form	at				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)	X		X		X	Presentation	4.1F, 4.2E	50%	5.5	BW 8 or 9	5 WD	BW 10	< 10
							4.3F t/m 4.3I				before resit		workdays
TOETSO2 (VT)		X		X		Case study exam	4.3F t/m 4.3I	50%	5.5	BW 5	10 WD before resit	BW 10	< 10 workdays

 <sup>&</sup>lt;sup>22</sup> Mandatory: no, 2 out of 4 from CU75054, CU75055, CU75056, CU75057 (Further information see manual of personality on learn)
 <sup>23</sup> P/NP stands for Passed/Not Passed. In Dutch Voldaan/Niet voldaan.

Block 3 / Sem	ester	2 – M	odern Soft	ware	Devel	opment							
CU75008V1	Title:	Frame	work Devel	opmen	t 1 (FC	DE1)	Number of study credits	:5 Conta	t hours: 60	Mand	atory: Yes	Teaching languag	ge: NL/ENG
Conditions for	Conditions for course participation: none												
Conditions for	Conditions for test participation: none												
Brief description	Brief description of course content: The student learns the basic principles of a specific framework. The student will learn to apply that framework in a project.												
Compulsory lit	Compulsory literature: none												
Test code	Form	at				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0		G			Factor (%)	score	test in	of work in	scheduled	of resit in
	v	vv	0	•	G					week	week	in week	week
TOETS01 (VT)		X	Х	X		Case study exam	1.3A, 4.2B,	100%	5.5	BW 4 or 5	5 WD	BW 10	< 10
							4.2C, 4.3A				before resi	it	workdays

CU75009V4	Title	e: Fram	ework Pr	oject 1	l (FPR.	1)	Number of study credits: 7,5	Contact hour	<b>s:</b> 60	Manda	atory: Yes	Teaching langua	ge: NL/ENG
Conditions for cou	ırse pai	rticipat	ion: none	e									
Conditions for test	t partic	ipatior	n: none										
Brief description of within given frame Compulsory litera	eworks.		ent: Requ	uireme	ent and	alysis (identify req	uirements and wishes) and softwo	are-developme	ent process. Stu	dents work ii	n groups on	real life SDG relat	ted cases
Test code	Form	nat				Assessment typ	pe Content	Weighting	Minimum	Planning	Inspectio	n Resit	Inspection
	v	w	0		G			Factor (%)	score	test in	of work in	n scheduled	of resit in
	ľ	~~	Ũ	· ·	Ŭ					week	week	in week	week
TOETS01 (VT)	X	X	X		X	Criterium based	d 1.3B, 4.5A, 7.4E,	33%	5.5	BW 8 or 9	>5 WD	BW 10	<10 WD
						interview	4.2A, 4.5C, 4,3B						
TOETS02 (VT)		X		X	X	Assignment	2.1A, 2.2A, 4.1A,	33%	5.5	BW 8 or 9	>5 WD	BW 10	<10 WD
							4.1B, 4.1C						
TOETS03 (VT)		X		X		Case study exar	m 4.2A	34%	5.5	BW 8 or 9	>5 WD	BW 10	<10 WD

Block 4 / Semester 2 – Modern Software Developmer
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CU75011V3 **Title:** Framework Project 2 (FPR2) Number of study credits: 10 Contact hours: 70

Mandatory: Yes | Teaching language: NL/ENG

**Conditions for course participation:** *none* 

**Conditions for test participation:** none

Brief description of course content: The course focuses on the application of the prior gained knowledge about human-machine interaction principles and advanced framework principles. The students learns to study more advanced concepts of a given framework, like the connection of information from more (then one) tables, the use of notifications and other innovations that suits the project (each group defines their own sprint goals). Student work on a real life project related to the SDG's. Students will deliver their final product to the client and will work on acceptation tests on their products. Student can apply a variation of certain IT developments and techniques to their project. In this way students can choose (in addition to a general basis) their own personalized theme to deepen or broaden.

#### Compulsory literature: none

Test code	Form	nat				Assessment type	Content	Weighting	Minimum	Planning test in	Inspection of work in	Resit	Inspection of resit in
	v	w	0	I	G			Factor (%)	score	week	week	scheduled in week	week
TOETS01 (VT)	X	X			X	Final delivery	1.3C, 1.3D	25%	5.5	BW 9 or 10	5 WD	BW 10	< 10 WD
							4.5E				before resit		
TOETS02 (VT)	X	X		X		Report of acceptance tests and optional assessments	4.1D, 4.1E, 4.1G, 4.2D, 4.5B, 4.5D	25%	5.5	BW 1 to 9	5 WD before resit	BW 10	< 10 WD
TOETS03 (VT)		x	X	X		IT Development portfolio	1.3E, 3.3A, 4.3C t/m 4.3E	50%	5.5	Q4: BW 1 to 9 Q2: BW 5	5 WD before resit	Only Q4: BW 10	< 10 WD

CU75055V1	Title:	IT Pers	sonality	ı Intern	national v	week (PIW)	Number of study credits: 1.2	5 Contact	<b>hours:</b> 36	Manda No <sup>24</sup>	atory:	Teaching langua	ge: NL/ENG
Conditions for	course	partici	pation	none						•			
Conditions for	test pa	rticipa	tion: no	one									
Brief description	on of co	ourse c	ontent	IT Per	sonality	content is based on tl	he HZ-wide programme HZ pers	sonality that	stimulates the	skills concernii	ng and attitud	les towards pers	onal
development a	nd pers	onal le	adersh	ip. The	progran	nme can either have d	a broadening or a deepening fo	cus when it	comes to the c	urriculum. Each	year the ICT	orogram organiz	es an
international w	eek. If	possibl	e, inclu	ding a	visit in a	n international city. T	his international week course c	an be chose	n as 1,25 ec co	ntent for perso	nality.		
The assessmen	t criteri	a and a	assessn	nent pr	ocess ar	e listed in the IT Perso	onality 2021-2022 instruction m	anual which	n can be found	on the Learn po	nge.		
This course is a	already	approv	ved for	IT pers	onality, s	students only need to	define their personal goals wit	hin the give	n context.				
Compulsory lit	erature	e: none											
Test code	Form	at				Assessment type	Content	Neighting	Minimum	Planning	Inspection	Resit	Inspection
			-					actor (%)	score	test in	of work in	scheduled	of resit in
	V	w	0	1	G					week	week	in week	week
TOETS01 (VT)		X	X	Х		Portfolio	7.2N	100%	P/NP <sup>25</sup>	CW 16, 17	CW 18	CW 22	CW 24

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 <sup>&</sup>lt;sup>24</sup> Mandatory: no, 2 out of 4 from CU75054, CU75055, CU75056, CU75057 (Further information see manual of personality on learn)
 <sup>25</sup> P/NP stands for Passed/Not Passed.

CU75057V1	Title:	IT Pers	sonality	י 2 (ITP	2)		Number of study credits: 1.	25 Contact	<b>hours:</b> 36	Manda No <sup>26</sup>	tory: Te	eaching languag	ge: NL/ENG
Conditions for	course	partici	pation	: none									
Conditions for	test pa	rticipat	tion: no	one									
	es is ha can be j	ving ob found c	tained on the L	a GO f	rom on		a broadening or a deepening j coordinators. The assessment						
Test code	Form	at				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETSO1 (VT)		X	X	X		Portfolio	7.2L	100%	P/NP <sup>27</sup>	CW 44 or 4 or 15 or 22	CW 46 or 6 or 17 or 24	CW 44 or 4 or 15 or 22	CW 46 or 6 or 17 or 24

 <sup>&</sup>lt;sup>26</sup> Mandatory: no, 2 out of 4 from CU75054, CU75055, CU75056, CU75057 (Further information see manual of personality on learn)
 <sup>27</sup> P/NP stands for Passed/Not Passed

CU75068V2	Title: Pers	sonal Prof	essional	Develo	opmer	nt: Exploration (PPD-E)	Number of study c	redits:	Contact hours	: Manda	tory: Yes 1	Feaching langua	ge: NL/ENG
	(INT Class	;)					12,5		70				
Conditions for cou	rse participati	i <b>on:</b> none								<u>.</u>	<u>.</u>		
<b>Conditions for test</b>	participation	: none											
referencing. Report feedback based im	ting skills are o provement ca is case: self-ste	applied on n be demo	the subj onstrated	ect of I in the	game seco	ences, in this case: aspo development and com nd reading and writing thodical judgment, con Assessment type	nbined with further gui assignment. General	idance on dev bachelor com our in project Weighting	elopment as a petences in Ag groups. Minimum	n (internation ile working p Planning	al) ICT stude roject groups	nt on this progra (by retrospectiv Resit	am. The ve feedback Inspection
	v	w	0	I	G	-		Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X		X		English Test	7.3A, 7.3B, 7.3F	5%	P/NP	BW 8	< 10 WD	BW 10	< 10 WD
TOETS02 (VT)	X	X		X		Criterium focused interview	7.20 to 7.2R, 7.3C to 7.3E, 7.4L to 7.4P, 7.5D to 7.5F	95%	5.5	BW 3 or 4 or 5	< 10 WD	BW 10	< 10 WD

CU75079V1	Title: Per	sonal Prof	essional	Develo	opmer	nt: Exploration (PPD-E)	Number of study c	redits:	Contact hours:	Manda	tory: Yes	Teaching langua	ge: NL/ENG
	(NL Class,	)					12,5		70				
Conditions for cours	se participat	ion: none											
Conditions for test	participation	: none											
Brief description of	course conte	ent: same	as CU75	068V2									
Compulsory literatu	<b>ire:</b> none												
Test code	Format					Assessment type	Content	Weighting	Minimum	Planning	Inspectio	n Resit	Inspection
	V	14/	•		G			Factor (%)	score	test in	of work i	n scheduled	of resit in
	v	W	0		G					week	week	in week	week
TOETS01 (VT) 28		X		X		Test (Dutch)	7.3F	5%	P/NP	BW 8	< 10 WD	BW 10	< 10 WD
TOETS02 (VT)		X		X		Test (English)	7.3A, 7.3B, 7.3F	5%	P/NP	BW 8	< 10 WD	BW 10	< 10 WD
TOETS03 (VT)	X	X		X		Criterium focused	7.20 to 7.2R, 7.3C	90%	5.5	BW 3 or 4	< 10 WD	BW 10	< 10 WD
						interview	to 7.3E, 7.4L to			or 5			
							7.4P, 7.5D to 7.5F						

<sup>&</sup>lt;sup>28</sup> TOETS01 (VT) of the course CU75079V1 is only mandatory for students of the Dutch track.

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# 2.2.5 Main phase courses (article 3.6, 3.11A CER HZ ba ft)

Block 5 / Sem	ester	1 – Use	er Valu	e Explora	ation									
CU75016V1	Title:	: Continu	uous Int	egration	(CIN)		Number o	of study credits: 5	Contact	hours: 28	Mand	atory: Yes 1	Feaching languag	ge: NL/ENG
Conditions for	course	partici	pation:	none										
Conditions for	test pa	articipat	ion: nor	пе										
complete CI pip The course plan Compulsory lite	eline w ning is erature	vith an d s based d <b>e:</b> none	automat on diffei	ed build f	for a g	ugh understanding iven project. Add tes eases. Improved by	sts and me	tric tools like code each deliverable w	coverage to co ill be part of th	ontrol the softv e final portfolio	vare quality. C o.	ourse will be b	based on several	deliverables.
Test code	Form	nat				Assessment type		Content	Weighting Factor (%)	Minimum score	Planning test in	Inspection of work in		Inspection of resit in
	v	w	0	I	G					30012	week	week	scheduled in week	week
TOETS01 (VT)	X	X	X	X		Portfolio & Assess	ment	4.5F t/m 4.5J	100	5.5	BW 8	5 WD before resit	BW 10 t	< 10 WD

CU75076V1	Title	: User	Valu	e Exp	loratio	n (UVE) Number o	of study credits: 10	Contact hours:	40	Man	datory: Yes	Teaching langua	age: NL/ENG
Conditions for course	partio	ipatio	<b>n:</b> nc	one									
Conditions for test pa	articipa	ation:	none										
Brief description of c	ourse	conter	nt: Us	er ce	ntered	focus on exploring a problen	n context, setting up	an architecture ai	nd understand	ling the user.			
Compulsory literatur	e: non	е											
Test code	Forn	nat				Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in week	Inspectio of work in week		Inspection of resit in week
	v	W	0	I	G								
TOETS01 (VT)		X		X		Individual test	1.1B, 1.2B, 1.3K, 4.2N, 4.2J, 4.2V, 4.2W, 4.2U, 4.3S	50%	5.5	BW 4	BW 5	BW 8	BW 9
TOETSO2 (VT)	X	X	X	X	X	Book test and assessment	4.1T, 4.1U, 4.1V, 4.1W	40%	5.5	BW 7	BW 7	BW 8	BW 9
TOETS03 (VT)					X	Project work environment assessment	4.3S, 4.2U, 4.2W	10%	5.5	BW 8	BW 9	BW 9	BW 10

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CU75058V1	Title:	IT Pers	sonality	' Projec	tweek 2 (PPW	(2) Nu	mber of study credits: 1.25	Contact	<b>hours:</b> 36	Manda No <sup>29</sup>	tory: T	eaching langua	ge: NL/ENG
Conditions for	course	partici	pation	none:						110			
Conditions for	test pa	rticipat	t <b>ion:</b> no	one									
either have a l other program	roaden s. This p	ing or a projectv	a deepe veek co	ening fo ourse co	ocus when it co an be chosen c	omes to the curricule as 1,25 ec content fo		ram organiz	es a projectwe	ek with real life	casus and (if p		0
	Iready	approv	ed for I	•			ty 2021-2022 instruction mo ne their personal goals with		-	on the Learn pa	ge.		
	Iready	approv e: none	ed for I	•	onality, studen		ne their personal goals with		-	on the Learn pa	ge.	Resit	Inspectior
Compulsory lit	lready erature	approv e: none	ed for I	•	onality, studen	ts only need to defir	ne their personal goals with Content V	in the given	context.		-	Resit scheduled in week	Inspectior of resit in week

<sup>29</sup> Mandatory: no, 3 out of 4 from CU75058, CU75059, CU75060, CU75061 (Further information see manual of personality on learn)
 <sup>30</sup> P/NP stands for Passed/Not Passed.

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Determined by Executive Board: 12/07/2022 Approval HR 12/07/2022 - recommendation programme committee: 18-05-2022
CU75059V1	Title:	IT Pers	sonality	/ 3 (ITP	?3)		Number of study credits: 1.	25 Contact	<b>hours:</b> 36	Manda No <sup>31</sup>	atory:	Feaching languaន្	ge: NL/ENG
Conditions for	course	partici	pation	: none									
Conditions for	test pa	rticipat	tion: no	one									
•	es is ha can be j	ving ob found c	tained on the L	a GO f	from on		a broadening or a deepening f coordinators. The assessment					-	
Test code	Form	at				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X	X	X		Portfolio	7.2L	100%	P/NP <sup>32</sup>	CW 44 or 4 or 15 or 22	CW 46 or 6 or 17 or 24		CW 46 or 6 or 17 or 24

Block 6 / Semester	1 – Us	ser Va	lue C	reat	tion										
CU75078V1	Title	: User \	/alue	Crea	ntion (	UVC)	Num	ber of study credits: 5	Contact	hours: 50	P	Mandatory: Ye	5 Te	aching langua	ge: NL/ENG
Conditions for course	partic	cipation	n: non	пе											
Conditions for test pa	rticipa	ation: n	one												
Brief description of co	ourse o	conten	t: Use	r cei	ntred	approach on creating a s	olutio	n for a complex problem	1						
Compulsory literature	e: none	е													
Test code	Form	nat				Assessment type		Content	Weighting	Minimum	Planni	ing Inspec	tion	Resit	Inspection
	v	w	ο	1	G				Factor (%)	score	test in	n of wor	k in	scheduled	of resit in
	v	~~	Ŭ	l .	J						week	week		in week	week
TOETS01 (VT)	X	X		1	Х	Group assessment bas	ed	1.1B, 1.3M, 1.3L,	100%	5.5	BW 7	BW 7		BW 8	BW 10
						on products in a portfo	olio	1.3N, 4.2N, 4.2J,							
								4.2K, 4.3S							

<sup>31</sup> Mandatory: no, 3 out of 4 from CU75054, CU75055, CU75056, CU75057 (Further information see manual of personality on learn)

<sup>32</sup> P/NP stands for Passed/Not Passed. Implementation Regulations HZ CER HBO-ICT - full-time

Determined by Executive Board: 12/07/2022 Approval HR 12/07/2022 - recommendation programme committee: 18-05-2022

CU75072V1	Title	: Data D	riven Business (	DDB)	N	umber of study credits: 5	Contact	hours: 24	Mandatory	: Yes <sup>33</sup> <b>T</b>	eaching langua	ge: ENG
<b>Conditions for</b>	course	e partici	pation: none									
<b>Conditions for</b>	test pa	articipat	i <b>on:</b> none									
Brief description	on of c	ourse co	ontent: Introduc	tion in '	"how to become a data	driven organization". Stu	dents will lear	n the definition	of Data Drive	n business and	why companies	s want or need
to change theii	r busine	ess. Stud	lents are given t	ools to	determine which comp	anies are data driven. Furt	hermore they	will have unde	erstanding in w	hat is needed ;	for companies t	o become
data driven. Ad	dition	ally, from	n a maturity pol	nt of vie	ew, students will be inti	roduced to an exemplary r	oadmap in wh	nich a company	, may become	data driven. In	addition, stude	nts are given
insight in flaws	s, failur	es & dor	n'ts of becoming	data d	riven. All aspects of the	courses will be backed by	real-life cases	s, so far as pos	sible. Lastly th	e connection to	Data Strategy	will be
explained, to e	nsure s	students	understand wh	at the e	nd-goals may look like	in a broader overview. Stu	dents will wor	k in groups of	3 or 4 (depend			
	nsure s	students	understand wh	at the e	nd-goals may look like	in a broader overview. Stu	dents will wor	k in groups of	3 or 4 (depend			
course).			understand wh	at the e	nd-goals may look like	in a broader overview. Stu	dents will wor	k in groups of	3 or 4 (depend			
explained, to el course). Compulsory lit Test code		e: none	understand wh	at the e	nd-goals may look like	in a broader overview. Stu	dents will wor Weighting	k in groups of Minimum	3 or 4 (depend			
course). Compulsory lit	eratur Form	e: none			- , 					's on the numbe	er of students st	arting the
course). Compulsory lit	eratur	e: none	understand wh	ot the e	- , 		Weighting	Minimum	Planning	is on the numbe	er of students st	arting the
course). Compulsory lit	eratur Form	e: none			- , 		Weighting	Minimum	Planning test in	Inspection	Resit scheduled	Inspection of resit in

CU75020V2	Title:	Softwa	re Desig	ın (SDE)			Number of study credits: 5	contact	hours: 24	Mandatory:	Yes <sup>34</sup> Te	eaching langua	ge: ENG
Conditions for	course	particip	bation: /	none									
Conditions for	test pa	rticipat	ion: nor	пе									
Brief description	on of co	ourse co	ntent: /	Make sof	tware	robust! Learn how t	o detect weak spots in progr	amming code (	code smells) a	nd how to solve	e them (refacto	oring) with prov	en solutions
like design patt	erns. S	tudent v	vill learı	n to Dete	ct desi	gn patterns with a t	ool in an open source softwa	are system and	will report the	result (includin	g class diagrar	m) in a short re	oort. Student
will learn to ap	oly refa	actoring	in an of	pen sourc	e softv	vare system and rep	port their findings and opinio	on in a blog. Stu	dents will Crea	ite in pairs a w	orking progran	n that houses m	nultiple design
patterns.													
Compulsory lite	erature	e: none											
Test code	Form	at				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	14/	0		G	-		Factor (%)	score	test in	of work in	scheduled	of resit in
	v	vv	0		G					week	week	in week	week
TOETS01 (VT)		X		X		Report	4.3J	30%	5.5	BW 4	WD < 10	BW 10	< 10 WD
TOETS02 (VT)		X		Х		Blog	4.3L	30%	5.5	BW 6	WD < 10	BW 10	< 10 WD
TOETS03 (VT)		X			X	Program	4.3K	40%	5.5	BW8	WD > 5	BW 10	< 10 WD

<sup>&</sup>lt;sup>33</sup> Course choice: CU75072 or CU75020

<sup>&</sup>lt;sup>34</sup> Course choice: CU75072 or CU75020

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CU75069V2	Title: Person	nal Profe	essional	Develo	opmei	nt: Advanced (PPD-A)	Number of st 8,75	udy credits:	Contact hours 70	: Mandat	tory: Yes 1	eaching langua	ge: NL/ENG
Conditions for co	urse participation	<b>n:</b> none									<u>.</u>		
Conditions for tes	st participation: n	none											
case: working in a methodical judgm Project managem	planned manner pents, communica ent: the student l	, showin tive beh earns th	ng and co aviour ir e relatio	oordin n a pro nship	ating oject c of pro	ences in Agile working appropriate efforts, m context. oject management (PN skills during the projec	notivated coopera	ition, team-orier velopment and c	nted and self-mo	naging action management	s, self-directed methods and	l (team) learnin methodologies d	g, are treated,
level of reading, u	nderstanding, wr		5			ect environment. Durir for practical professio	5 5	nester students o	can practice, rea	ceive feedback	and need to a	emonstrate a si	ufficient
level of reading, u Compulsory litera	nderstanding, wr ature: none		5			for practical professio	nal situations.		· ·				
level of reading, u	nderstanding, wr ature: none Format	iting and	d presen		skills		5 5	Weighting Factor (%)	Can practice, red	eive feedback	and need to a Inspection of work in	emonstrate a su Resit scheduled	ufficient Inspection of resit in
level of reading, u Compulsory litera	nderstanding, wr ature: none		5			for practical professio	nal situations.	Weighting	Minimum	Planning	Inspection	Resit	Inspection
level of reading, u Compulsory litera Test code	nderstanding, wr ature: none Format	iting and	d presen		skills	for practical professio	nal situations.	Weighting	Minimum	Planning test in	Inspection of work in	Resit scheduled	Inspectior of resit in
level of reading, u Compulsory litera Test code	nderstanding, wr ature: none Format V	iting and	d presen	tation	skills	for practical professio Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	Inspectior of resit in week
level of reading, u Compulsory litera Test code	nderstanding, wr ature: none Format V	iting and	d presen	tation	skills	for practical professio Assessment type Criterium focused	Content 7.20 to 7.2R	Weighting Factor (%)	Minimum score	Planning test in week BW 2 or 3	Inspection of work in week	Resit scheduled in week	Inspectior of resit in week
level of reading, u Compulsory litera	nderstanding, wr ature: none Format V	iting and	d presen	tation	skills	for practical professio Assessment type Criterium focused	Content 7.20 to 7.2R 7.3C to 7.3G	Weighting Factor (%)	Minimum score	Planning test in week BW 2 or 3	Inspection of work in week	Resit scheduled in week	Inspection of resit in week

<sup>35</sup> P/NP stands for Passed/Not Passed.

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Block 7 / Sem	ester	2 – Da	ita Sci	ence									
CU75073V1	Title	: Data	Driven	Decisio	n maki	ng (DDD)	Number of study credits: 10	Contact	<b>t hours:</b> 50	Manda	atory: Yes	Teaching langua	ge: ENG
Conditions for	course	partic	ipation	none:									
Conditions for	test pa	rticipa	tion: n	one									
Brief descriptio	n of c	ourse c	ontent	: Gettin	g acqu	ainted with the it	erative Data Science process, in which	h all the stage	s of the cycle o	are completed.	. The empha	sis is on creating	insight,
		•					P-DM methodology on a Data Science						
Student still wo	rk in s	orints b	ut follo	ow the s	teps oj	f CRISP-DM. Pytho	n classes are introduced to educate t	he much need	ded skill set in	data science p	rojects. Deli	verables are deliv	ered to the
client in a demo	o and t	he step	s are e	valuate	d. Deli	verables are deliv	ered in a professional portfolio.						
							nts analyse the organisation includin	g organisatio	nal processes	using standara	lised method	ls. Organisationa	l analysis and
	-						delivered in a professional portfolio.						
							ions from a security perspective. Estir	nating the im	pact of data, s	software and I	T related de	velopments on so	ciety from an
ethical perspect				bout dif	ferent	points of view.							
Compulsory lite	eratur	e: none				1				T		F	T
Test code	Form	nat				Assessment typ	e Content	Weighting	Minimum	Planning	Inspection		Inspection
	v	w	0	1	G			Factor (%)	score	test in	of work in	scheduled	of resit in
			-	-	-					week	week	in week	week
TOETS01 (VT)	(X)	Х		Х	Х	Portfolio	2.1B,2.1C,2.1D,2.1I,2.4A	30%	5.5	BW6	< 10	BW 10	< 10
							6.1A t/m E				workday		workday
TOETS02 (VT)	Х	Х		Х	Х	Criteria focused	6.2A t/m F,6.3A,	45%	5.5	BW9 or 10	≥5	BW 10	< 10
						interview	6.3B,6.3C,6.4A t/m D				workdays		workday
							7.3Q,7.3P, 7.3R, 4.5K				for resit		
TOETS03 (VT)	Х	Х		Х	Х	Presentation	7.2D	25%	5.5	BW4 or 5	≥5	BW 10	< 10
											workdays		workday
											for resit		

Block 8 / Se	emeste	er 2 – I	Data S	cienc	9			_				_	
CU75074V1	Title	e: Data	Scienc	e / AI	(DSAI,	) N	umber of study credits: 7,5	Contac	t hours: 50	Manda	tory: Yes	Teaching langu	age: ENG
Conditions f	or cour	se part	ticipati	on: no	ne								
Conditions f	or test	partici	pation	none									
-					-		rative Data Science process, in P-DM methodology on a Data S					nphasis is on cre	eating insight,
Student still	work in	sprint	s but fo	ollow th	he ste	os of CRISP-DM. Pythoi	n classes are introduced to edu	cate the much i	needed skill se	t in data scier	nce projects. I	Deliverables are	delivered to the
The first step the first pha Further stud	os are bi ses of C ents lea pective c	usiness RISP-D Irn to b and ela	and d M are able borate	ata un combii to viev	dersta ned ar v syste	anding. Therefor studer ad the deliverables are	red in a professional portfolio. Its analyse the organisation ind delivered in a professional port ons from a security perspective	folio.		-		-	
Test code	Forr	nat				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)	х	Х	Х	Х	х	Criteria focused interview	6.1F,6.1G,6.1H,6.2G t/m K,6.3D,6.3E,6.3F,6.4E	80%	5.5	BW8 or 9	≥5 workdays for resit	BW 10	< 10 workday
							t/m H 7.3Q,7.3P						

CU75028V2	Title	: Cloud (	Computi	ng (CCO)			Number of study credits: 5	Contact	: <b>hours:</b> 24	Mandatory:	Yes <sup>36</sup> Te	eaching langua	ge: ENG
Conditions for	course	partici	pation: /	none							<u>.</u>		
<b>Conditions for</b>	test pa	articipat	ion: nor	ie									
Brief description	on of c	ourse co	ontent: נ	Jse cloud	d specij	ic building blocks like	e serverless functions and di	fferent kinds o	f cloud storage	e, learn how to a	connect and m	onitor them, to	let your
project scale o	n a nev	v level.											
Course DVI is n	nandat	ory for s	tudy tra	ck Busin	ess IT (	Consultant.							
Course CCO is I	manda	tory for :	study tra	ack Softw	vare Er	gineer.							
Course CCO & I	DVI are	manda	tory for	study tra	ick Dat	a Science. DVI will ta	ke place in year 2 and CCO i	in year 4.					
<b>Compulsory lit</b>	eratur	e: none											
Test code	Form	nat				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
						-		Factor (%)	score	test in	of work in	scheduled	of resit in
	V	W	0	1	G					week	week	in week	week
TOETS01 (VT)		X		Х		Research proposal	3.3A, 3.4A, 3.5A	40%	5.5	BW 4 or 5	WD < 10	BW 10	< 10 WD
TOETS02 (VT)		X		Х		Research report ar	nd 3.3A, 3.4A, 3.5A	60%	5.5	BW 8 or 9	WD > 5	BW 10	< 10 WD
						proof of concept							

CU75027V3	Title	: Data	Visualiz	ation (D	VI)	Numb	per of study credits:	5 Contact	hours: 24	Mandatory:	Yes <sup>37</sup> Te	eaching langua	ge: ENG
Conditions for course	partic	ipation	: none										
Conditions for test pa	rticipa	tion: n	one										
Brief description of c	ourse o	ontent	: Creati	ing a suit	able d	ata visualization for com	municating informati	ion to a client	. You will learn	about data vis	ualization goa	ls, types and c	haracteristics
and how to research	he bes	t choice	es for yo	our speci	fic cas	e. To conclude your resea	rch, you will create a	n actual data	visualization (	proof of conce	ot).		
Course DVI is mandat	ory for	study t	rack Bu	isiness IT	Consu	ltant.							
Course CCO is manda	tory fo	r study	track So	oftware l	Engine	er.							
Course CCO & DVI are	mand	atory fo	or study	rtrack Do	ata Sci	ence. DVI will take place i	n year 2 and CCO in y	year 4.					
Compulsory literatur	e: none	2											
Test code	Form	nat				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
				r .				Factor (%)	score	test in	of work in	scheduled	of resit in
	v	w	0		G					week	week	in week	week
TOETS01 (VT)	X	X		X		Portfolio with optional	1.4A, 1.4B,	100%	5.5	BW 8 or 9	WD < 10	BW 10	< 10 WD
						assessment	1.4C, 1.4D						

<sup>&</sup>lt;sup>36</sup> Course choice: CU75028 or CU75027

<sup>&</sup>lt;sup>37</sup> Course choice: CU75028 or CU75027

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Determined by Executive Board: 12/07/2022

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#### **SPECIALISATIONS**

#### Personality

All students of all tracks have to gain their credits for personality.

CU75075V1	Title:	IT Pers	sonality	v Projec	tweek :	3 (PPW3)	Number of study credits: 1.25	Contact	<b>hours:</b> 36	Manda No <sup>38</sup>	atory: T	eaching langua	ge: NL/ENG
Conditions for	course	partici	pation	: none									
Conditions for	test pa	rticipat	tion: no	one									
either have a b other program The assessmen	roaden s. This p t criteri Iready o	ing or c projectv a and c approve	a deepe week co assessm ed for I	ening fo ourse co nent pr	ocus wh an be cl ocess a	en it comes to the curr nosen as 1,25 ec conte re listed in the IT Perso	tes the skills concerning and atti iculum. Each year the ICT progro nt for personality. nality 2021-2022 instruction ma define their personal goals within	m organize nual which	es a projectwe can be found	ek with real life	casus and (if )		-
Test code	Form	at				Assessment type		eighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G		Fa	ctor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X	X	X		Portfolio	7.2M	100%	P/NP <sup>39</sup>	CW 43 or 44 or 45 or	CW 47	CW 3	CW 5

<sup>38</sup> Mandatory: no, 4 out of 5 from CU75062, CU75063, CU75064, CU75065, CU75075 (Further information see manual of personality on learn)

<sup>39</sup> P/NP stands for Passed/Not Passed

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CU75062V1	Title:	IT Pers	sonality	י 6 (ITP	6)		Number of study credits: 1.25	Contact	<b>hours:</b> 36	Manda No <sup>40</sup>	itory: T	eaching languag	e: NL/ENG
Conditions for	course	partici	pation	none									
Conditions for	test pa	rticipat	tion: no	one									
•	es is hav can be f	ving ob found c : none	tained on the L	a GO fi	rom on		broadening or a deepening foc coordinators. The assessment cri Content W			•	• •	-	
					-	/ locoonient type		ctor (%)	score	test in	of work in	scheduled	of resit in
	v	W	0	I	G					week	week	in week	week
						C . II		4000/	D (NID/1	<u></u>		-	
TOETS01 (VT)		X	X	X		Portfolio	7.2L	100%	P/NP <sup>41</sup>	CW 44 or 4	CW 46 or 6	CW 44 or 4	CW 46 or 6

CU75063V1	Title:	IT Pers	sonality	/ 7 (ITP	7)		Number of study credits: 1.25	Contact I	<b>hours:</b> 36	Manda No <sup>42</sup>	tory: To	eaching languag	<b>ge:</b> NL/ENG
Conditions for	course	partici	pation	:none									
Conditions for	test pa	rticipat	tion: no	one									
	es is hai can be j	ving ob found c	tained on the L	a GO f	from on		broadening or a deepening focu oordinators. The assessment cri					-	
Test code	Form	at				Assessment type		eighting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	I	G		Fa	ctor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X	X	X		Portfolio	7.2L	100%	P/NP <sup>43</sup>	CW 44 or 4	CW 46 or 6	CW 44 or 4	CW 46 or 6
		1			1					or 15 or 22	or 17 or 24	or 15 or 22	or 17 or 24

<sup>&</sup>lt;sup>40</sup> Mandatory: no, 4 out of 5 from CU75062, CU75063, CU75064, CU75065, CU75075 (*Further information see manual of personality on learn*) <sup>41</sup> P/NP stands for Passed/Not Passed.

<sup>42</sup> Mandatory: no, 4 out of 5 from CU75062, CU75063, CU75064, CU75065, CU75075 (*Further information see manual of personality on learn*)

<sup>43</sup> P/NP stands for Passed/Not Passed.

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CU75064V1	Title	: IT Pers	sonality	8 (ITP)	8)		Number of study credits: 1.2	5 Contact	<b>hours:</b> 36	Manda	tory: T	eaching languag	ge: NL/ENG
Conditions for	course	partici	pation	none						No <sup>44</sup>			
Conditions for	test pa	rticipat	tion: no	one									
Brief description	on of co	ourse co	ontent:	IT Per	sonalit	y content is based on th	e HZ-wide programme HZ pers	onality that	stimulates the	skills concernin	ng and attitud	es towards perso	onal
development a	nd pers	sonal le	adersh	ip. The	progra	mme can either have a	broadening or a deepening for	cus when it d	comes to the cu	ırriculum. A pre	requisite for s	tarting the HZ P	ersonality
related activitie	es is ha	ving ob	tained	a GO fi	rom on	e of the IT personality a	oordinators. The assessment c	riteria and a	ssessment nro	ress are listed in	n the H7 Perso	nality 2021-202	2 instruction
									ssessifient pro	coo are notea n	1 1110 112 1 0150	1141119 2021 202	2 111501 4001011
manual which	can be	found c		-					ssessment pro			nunty 2021 202	2 111511 4001011
			on the L	-									2
manual which Compulsory lit Test code		e: none	on the L	-		Assessment type		Veighting	Minimum	Planning	Inspection	Resit	1
Compulsory lit	erature	e: none nat	on the L	-	age.		Content \				1	-	Inspection of resit in
Compulsory lit	erature	e: none	on the L	-			Content \	Veighting	Minimum	Planning	Inspection	Resit	Inspection
Compulsory lit	erature	e: none nat	on the L	-	age.		Content \	Veighting	Minimum	Planning test in	Inspection of work in	Resit scheduled	Inspection of resit in

<sup>44</sup> Mandatory: no, 4 out of 5 from CU75062, CU75063, CU75064, CU75065, CU75075 (*Further information see manual of personality on learn*) <sup>45</sup> P/NP stands for Passed/Not Passed.

<sup>43</sup> P/NP stands for Passed/Not Passed. Implementation Regulations HZ CER HBO-ICT - full-time

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CU75065V1	Title:	IT Pers	sonality	9 (ITP)	9)		Number of study credits: 1.2	5 Contact	<b>hours:</b> 36	Manda No <sup>46</sup>	tory: T	eaching languag	ge: NL/ENG
Conditions for	course	partici	pation	none						110			
Conditions for	test pa	rticipa	tion: no	one									
Brief description	on of co	ourse co	ontent:	IT Per	sonalit	y content is based on th	he HZ-wide programme HZ per	sonality that	stimulates the	skills concernin	ng and attitude	es towards perso	onal
development a	nd pers	onal le	adersh	ip. The	progra	ımme can either have d	a broadening or a deepening fo	cus when it d	comes to the ci	ırriculum. A pre	requisite for s	tarting the HZ P	ersonality
•	•			•			coordinators. The assessment of			•		-	
		5											
manual which	can be	found c	on the L	earn p	age.							,	
				earn p	age.								
manual which o Compulsory lit Test code		e: none		earn p	age.	Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
Compulsory lit	erature	e: none at		earn p	-	Assessment type					1		1
Compulsory lit	erature	e: none		earn p	age. G	Assessment type		Weighting	Minimum	Planning	Inspection	Resit	Inspection
Compulsory lit	erature	e: none at		earn p	-	Assessment type Portfolio		Weighting	Minimum	Planning test in	Inspection of work in	Resit scheduled	Inspection of resit in

<sup>46</sup> Mandatory: no, 4 out of 5 from CU75062, CU75063, CU75064, CU75065, CU75075 (Further information see manual of personality on learn)

<sup>47</sup> P/NP stands for Passed/Not Passed. Implementation Regulations HZ CER HBO-ICT - full-time

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## Software Engineering

CU75033V2	Tit	le: Inte	ernship	(ISE)		Nu	mber of study credits: 25	Contact	t hours: 20	Manda	tory: Yes	Teaching langua	age: NL/ENG
Conditions for	cours	e part	icipati	on:		•	· · · · · · · · · · · · · · · · · · ·						
• the student is	s in po	ossessi	on of t	he prop	oaede	utic certificate of the H	BO-ICT program;						
• the student h	as ob	tained	at lea	st 30 E	C of c	ompleted courses in the	second year of the program (ser	mesters 3 and	4).				
Conditions for	test p	particip	oation	none									
, 0			-	tives bo	ised c	on the HBO-ICT profession	onal competences and by reflecti	ing on his owr	n performance	. It concerns p	primarily proj	essional tasks s	pecifically in the
field of softwar Compulsory lit	re eng eratu	ineerir	ng.	tives bo	ised c	n the HBO-ICT profession	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
field of softwar Compulsory lit	re eng eratu	ineerir <b>re:</b> noi	ng.	tives bo	G G								
field of softwar Compulsory lit Test code	eratu For	re: noi re: noi	ng. ne	tives bo				Weighting	Minimum	Planning test in	Inspection of work in	Resit scheduled	Inspection
Compulsory lit Test code	eratu For	re: nor rat W	ng. ne <b>0</b>	1		Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week BW10 of	Inspection of resit in weel

	nesu	er 7 –	Softw	are E	ngine	ering							
CU75045V1	Titl	e: Mo	dern Pr	rogran	nming	Practices (MPP)	Number of study credits: 5	Contac	t <b>hours:</b> 15	Manda	tory: Yes 1	eaching langua	age: NL
Conditions for	cours	e parti	icipatio	on: no	ne								
Conditions for	test p	articip	oation:	none									
impact on qual	, ,												
comparsory ne													
Test code	For	mat				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	For V	mat W	0	1	G	Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	Inspection of resit in week

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611750421/4	TIAL		Softw	Destau	((0.0.0.)	Newsley of study and the F	Cantar	. h	D.A. a. a. d.a.	1		NU
CU75042V1	liti	e: Sec	urity by	' Design	(SBD)	Number of study credits: 5	Contac	<b>t hours:</b> 15	Manda	tory: Yes 7	eaching langu	age: NL
Conditions for	cours	e parti	cipatio	n: none								
Conditions for	test p	articip	ation:	none								
aiven methods	and t	honu										
-				ropriate	advice about security	in the system.						
Compulsory lite Test code	eratu			ropriate	Assessment type	In the system.	Weighting	Minimum	Planning	Inspection	Resit	Inspection
Compulsory lite	eratu	r <b>e:</b> nor		· 		-	Weighting Factor (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	Inspection of resit in weel

Block 13 & 14	/ Se	emest	er 7 –	Softv	vare	Engineering							
CU75048V2	Titl	le: Gra	aduati	on Pre	parat	ion (GPR)	lumber of study credits	5 Conta	<b>ct hours:</b> 15	Mandato	ry: Yes T	eaching language: N	L
Conditions for	cours	se part	icipat	ion: n	one								
Conditions for	test p	partici	pation	: The s	tuder	nt is allowed to take t	he test when allowed co	ourse participation of	CU75047V1				
•							l be prepared on their gi e student, guidance in w		•		-		
Compulsory lite	eratu	ire: no	ne										
Test code	For	mat				Assessment type	Content	Weighting		Planning	Inspection	Resit scheduled	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	in week	of resit in week
TOETS01 (VT)		Х		Х		Graduation propos	al 7.5A	50%	P/NP <sup>48</sup>	BW 8 of B13	≥5 WD	BW 8 of B14 or	< 10 WD
												B15 or B16	
TOETS02 (VT)		Х		Х		Graduation plan	7.5B	50%	5.5	BW 8 of B14	≥5 WD	BW 8 of B13 or B15 or B16	< 10 WD

<sup>&</sup>lt;sup>48</sup> P/NP stands for Passed/Not Passed.

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	-		ster	7-:	soft	ware Engineer	ing	, and the second se						
CU75047V2	Tit	le: Co	omple	ex Pr	oject	SE (CPSE) N	umber of study credits: 15		Contact	t hours: 100	Mandato	ry: Yes T	eaching langu	age: NL
Conditions for	cou	rse p	artici	patio	on:									
• The student	is in	posse	ession	of t	he pr	opaedeutic certi	ficate of the HBO-ICT programme;							
• The student	has c	btaiı	ned a	t lea.	st 60	EC from the ma	in phase with completed courses;							
• The student	has p	oasse	d the	inte	rnshi	p (CU75033V2)4	9.							
Conditions for	test	part	icipat	tion:	none	?								
be specific for Compulsory li	the s terat	study cure:	track	. The			student will do a complex project in a small g f the results are similar with the graduation p	•					,,,,,,,,,,	
Test code	- FOI	mat				Assessment	Content	Weig	ghting	Minimum	Planning	Inspection	Resit	Inspection
Test code	Foi V	rmat W	0	I	G	Assessment type	Content	-	ghting or (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	-
	_		0	I X	G X		Content 7.1M,7.1N,7.3M	Facto			test in	of work in	scheduled	of resit in
	V	W	0	I X		type		Facto	or (%)	score	test in week	of work in week	scheduled in week	of resit in week
	V	W	0	I X		<b>type</b> Portfolio +	7.1M,7.1N,7.3M	Facto	or (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of	of resit in week
TOETS01(VT)	V	W	0	I X		<b>type</b> Portfolio +	7.1M,7.1N,7.3M 4.10,4.1P,4.1Q,4.1R,4.2Q,4.2R,	<b>Facto</b>	or (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of B14 or 15	week

<sup>49</sup> Students may submit a request for participation without internship, based on their obtained minor results and will be judged by examiners.

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CU75050V1	Tit	le: G	radu	ation	i Soft	ware Engineering	g (GSE) Number of st	udy credits: 30	Conta	ct hours: 5 Ma	indatory: Yes	Teaching langua	age: NL
Conditions fo	r cou	rse pa	artici	pati	on:								
• The student	is in	posse	ssior	n of t	he pr	opaedeutic certij	ficate of the HBO-ICT prograi	m;					
<ul> <li>The student</li> </ul>	has d	obtair	ned a	t lea	st 13	7.5 EC from the r	nain phase with completed c	courses.					
Conditions fo	r test	parti	icipa	tion:	As in	cluded in Gradu	ation Student Manual on the	graduation Learn pag	е.				
Brief descript	ion o	f cou	rse co	onte	nt: St	udents conduct	their graduation on a comple	ex practical assignmen	t in a complex si	tuation. The studen	s does this inde	ependently. The fina	l products
are qualitativ	e suff	icient	prof	essio	onal s	oftware enginee	ring products, supplemented	l with an account of th	e methodical an	d professional appro	bach.		
Final results w	vill be	prese	ented	l foll	owed	l by an assessme	nt of two examiners and pos	sibly one external expe	ert.				
Compulsory li	terat	ure:	none										
Test code	Foi	mat				Assessment	Content	Weighting	Minimum	Planning	Inspection	Resit scheduled	Inspectio
	v	w	0	1	G	type		Factor (%)	score	test in	of work in	in week	of resit in
	•	•••	Ŭ	•	•					week	week		week
TOETS01(VT)	Х	Х		Х		Portfolio +	7.10,7.1P,7.30	80%	5.5	BW7 of block 16	≥5	BW 10 of block	< 10
						assessment	4.1S,4.2T,4.3R,4.4E			or block 1,2,3,4	workdays	16 or BW 7 in	workday
										in the next	for resit	block 1,2,3,4 in	
										year. <sup>50</sup>		the next year 51	
TOETS02(VT)	Х	Х		Х		Presentation	7.3N	20%	5.5	BW9/10 of	≥5	BW 12 of block	< 10
										block 16 or	workdays	16 or BW 9/10 in	workday
	1				1						-		1
										block 1,2,3,4 in	for resit	block 1,2,3,4 in	

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<sup>&</sup>lt;sup>50</sup> One block after the starting block of the course.

<sup>&</sup>lt;sup>51</sup> At the latest 2 blocks after the starting block of the course.

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Approval HR 12/07/2022 - recommendation programme committee: 18-05-2022

## Data Science

Semester 5 &	6 – C	Data S	cienc	e									
CU75034V2	Titl	<b>e:</b> Inte	ernship	o (IDS)			Number of study credits: 25	Contac	t hours: 20	Manda	atory: Yes	Teaching langu	age: NL/ENG
Conditions for c	ours	e part	icipati	ion:									
• The student is	in po	ossessi	on of	the pro	paede	eutic certificate of th	e HBO-ICT program;						
• The student he	is ob	tainea	l at lea	ast 30 E	C of c	completed courses in	the second year of the program (se	emesters 3 and	14).				
Conditions for t	est p	articip	oation	:none									
field of software Compulsory lite Test code	ratu		5			Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
			1		1	/ losessinent type	content	Factor (%)	score	test in	of work in		of resit in week
	v	w	0	I	G					week	week	in week	
TOETS01 (VT)		Х	Х	Х		Portfolio	6.1K,6.2Q,6.3J,6.4K,7.1Q	100%	5.5	BW 8 of	BW 9 of	BW 10 of	< 10 workday
										block	block 1,2,3	block 1,2,3	
										1,2,3 & 4	& 4	& 4	1

CU75028V2	meste Title	: Cloud (	Computi	ng (CCO)		Nu	nber of study credits: 5	Contact	hours: 24	Mandatory:	Yes <sup>52</sup> T	eaching langua	ge: FNG
Conditions for				<u> </u>		110.		contact	110010121	manaatory	100	caeiiiig iaiigaa	<b>BC1</b> 2110
Conditions for	test pa	articipat	ion: nor	е									
Brief description	on of c	ourse co	ontent: נ	Jse cloud	l specif	ïc building blocks like ser	verless functions and di	fferent kinds oj	f cloud storage	, learn how to	connect and m	nonitor them, to	let your
project scale of	n a nev	v level.											
Course DVI is n	nandat	ory for s	tudy tra	ck Busin	ess IT C	`onsultant.							
Course CCO is i	nanda	tory for	ctudu tr	nal Caft									
		<i></i>	<i>stuuy tr</i> i	ιςκ σοιιν	vare En	gineer.							
				-		gıneer. a Science. DVI will take p	lace in year 2 and CCO i	n year 4.					
Course CCO &	DVI are	manda		-		-	lace in year 2 and CCO i	n year 4.					
	DVI are	e manda e: none		-		-	lace in year 2 and CCO i Content	n year 4. Weighting	Minimum	Planning	Inspection	Resit	Inspection
Course CCO & Compulsory lit	DVI are eratur Form	e manda e: none nat	tory for	-	ick Dat	a Science. DVI will take p	,	,	Minimum score	Planning test in	Inspection of work in	Resit scheduled	Inspection of resit in
Course CCO & Compulsory lit	DVI are eratur	e manda e: none		-		a Science. DVI will take p	,	Weighting	-	0	-		-
Course CCO & Compulsory lit	DVI are eratur Form	e manda e: none nat	tory for	-	ick Dat	a Science. DVI will take p	,	Weighting	-	test in	of work in	scheduled	of resit in
Course CCO & Compulsory lit	DVI are eratur Form	e manda e: none nat W	tory for	study tra	ick Dat	a Science. DVI will take p Assessment type	Content	Weighting Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week

Block 14 / Sen	nest	er 7 –	Data	Scien	ce								
CU75046V1	Tit	le: Dat	a Man	ageme	ent &	Governance (DAM)	Number of study credits: 5	Contac	<b>t hours:</b> 15	Manda	tory: Yes	Teaching langua	age: NL / ENG
Conditions for a	ours	e part	icipati	on: no	ne								
Conditions for t	est p	particip	oation	none									
Brief descriptio deepened (think Compulsory lite	c of le	egal as	pects,			, 3	know all aspects related to data n	anagement b	ased on the DN	Л-Boks. In ad	dition, a num	ber of aspects o	are chosen that are
Test code	For	rmat				Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspection
	v	W	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		X		Х		Portfolio	6.11	100%	5.5	BW 8 or 9	≥5 WD	BW 10	< 10 WD

<sup>&</sup>lt;sup>52</sup> Course choice: CU75028 or CU75027

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Block 13 & 14	/ Se	emest	er 7 –	Data	Scie	nce							
CU75048V2	Tit	l <b>e:</b> Gr	aduati	on Pre	parat	ion (GPR) N	umber of study credits:	5 Conta	<b>ct hours:</b> 15	Mandato	ry: Yes 1	<b>Feaching language:</b> N	L
Conditions for a	cours	se par	ticipat	ion: T	he sti	ident is allowed to tai	ke the test when allowed	l course participation	of CU75067V1				
Conditions for t	test p	oartici	pation	: none	•								
•	ding	a grac	luatio				l be prepared on their gr e student, guidance in w	riting a graduation p	roposal and gu	idance in writin	g a graduatio	n plan including resea	arch related
Test code	For	mat				Assessment type	Content	Weighting		Planning	Inspection	Resit scheduled	Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	in week	of resit in week
TOETS01 (VT)		Х		Х		Graduation proposa	al 7.5A	50%	P/NP <sup>53</sup>	BW 8 of B13	≥5 WD	BW 8 of B14 or	< 10 WD
												B15 or B16	
TOETS02 (VT)		Х		Х		Graduation plan	7.5B	50%	5.5	BW 8 of B14	≥5 WD	BW 8 of B13 or	< 10 WD
												B15 or B16	

<sup>53</sup> P/NP stands for Passed/Not Passed.

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CU75067V1	Tit	<b>e:</b> Co	omple	ex Pr	oject	DS (CPDS) N	umber of study credits: 15	Conta	<b>t hours:</b> 100	Mandato	ry: Yes T	eaching langua	age: NL
Conditions fo	cou	rse pa	artici	patio	<b>on:</b> n	one							
• The student	is in	oosse	ssion	of t	he pr	opaedeutic certi	ficate of the HBO-ICT program;						
• The student	has d	btair	ied a	t leas	st 60	EC from the mai	n phase with completed courses;						
• The student	has p	asse	d the	inte	rnshi	p (CU75034V2)⁵₄							
Conditions fo	' test	parti	cipat	ion:	none	2							
•	the s	tudy	track				tudent will do a complex project in a small grou the results are similar with the graduation phas	, , , , , , , , , , , , , , , , , , , ,	f lecturers and	d experts. Th	e project and	professional pr	roducts will
Test code	Foi	mat				Assessment	Content	Weighting	Minimum	Planning	Inspection	Resit	Inspectio
Test code	Foi V	mat W	0	I	G	Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	Inspectio of resit ir week
			0	I X	G X		Content 7.1M,7.1N,7.3M			test in	of work in	scheduled	of resit ir
	V	W	0	I X	_	type		Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
	V	W	0	I X	_	<b>type</b> Portfolio +	7.1M,7.1N,7.3M	Factor (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of	of resit ir week
Test code TOETS01(VT) TOETS02(VT)	V	W	0	I X	_	<b>type</b> Portfolio +	7.1M,7.1N,7.3M 4.10,4.1P,4.1Q,4.1R,4.2Q,4.2R,	Factor (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of B14 or B15	of resit in week

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<sup>&</sup>lt;sup>54</sup> Students may submit a request for participation without internship, based on their obtained minor results and will be judged by examiners.

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Approval HR 12/07/2022 - recommendation programme committee: 18-05-2022

CU75049V1	Tit	le: G	radua	ition	Date	a Science (GDS)	Number of stu	idy credits: 30	Conta	ct hours: 5 M	andatory: Yes	Teaching langua	age: NL
Conditions fo	r <mark>co</mark> u	rse p	artici	patio	on:								
• the student	is in p	oosse	ssion	of th	ne pri	opaedeutic certif	icate of the HBO-ICT program	;					
• the student	has c	obtair	ed a	leas	t 132	7.5 EC from the n	nain phase with completed co	urses.					
Conditions fo	r test	t part	icipat	ion:	As ir	ncluded in Gradu	ation Student Manual on the	graduation Learn pag	е.				
are qualitativ	e suff	ficien	prof	essio	nal s	oftware enginee	their graduation on a complex ring products, supplemented	with an account of th	e methodical an			ependently. The fina	l products
				follo	owed	l by an assessme	nt of two examiners and poss	ibly one external expe	ert.				
Compulsory li	terat	ture:	none				Γ	1			-	ſ	-
Test code	Foi	rmat				Assessment	Content	Weighting	Minimum	Planning	Inspection	Resit scheduled	Inspection
	v	w	0	Ι	G	type		Factor (%)	score	test in week	of work in week	in week	of resit in week
TOETS01(VT)	Х	Х		Х		Portfolio +	7.10,7.1P,7.30	80%	5.5	BW7 of block 16	≥5	BW 10 of block	< 10
						assessment	4.1S,4.2T,4.3R,4.4E			or block 1,2,3,4	workdays	16 or BW 7 in	workday
										in the next	for resit	block 1,2,3,4 in	
										year.55		the next year <sup>56</sup>	
						Duccoutotion	7.3N	20%	5.5	BW9/10 of	≥5	BW 12 of block	< 10
TOETS02(VT)	x	Х		Х		Presentation	7.51			'	-		
TOETS02(VT)	x	х		х		Presentation	7.51			block 16 or	workdays	16 or BW 9/10 in	workday
TOETS02(VT)	x	х		х		Presentation	7.51			block 16 or block 1,2,3,4 in	workdays for resit		-

Determined by Executive Board: 12/07/2022

<sup>&</sup>lt;sup>55</sup> One block after the starting block of the course.

<sup>&</sup>lt;sup>56</sup> At the latest 2 blocks after the starting block of the course.

Implementation Regulations HZ CER HBO-ICT - full-time

Approval HR 12/07/2022 - recommendation programme committee: 18-05-2022

## **Business IT Consultant**

Semester 5 &	6 – I	Busine	ess IT	Consu	Itan	cy							
CU75035V2	Tit	<b>e:</b> Inte	ernship	(IBIC)			Number of study credits: 25	Contac	<b>t hours:</b> 20	Manda	atory: Yes	Teaching langua	ige: NL/ENG
Conditions for o	ours	e part	icipati	on:									
• the student is in possession of the propaedeutic certificate of the HBO-ICT program;													
• the student has obtained at least 30 EC of completed courses in the second year of the program (semesters 3 and 4).													
Conditions for test participation: none													
field of software Compulsory lite	e eng ratu	ineerir	ng.			Assessment type	essional competences and by reflecti Content	Weighting	Minimum	Planning	Inspection		Inspection
	v	w	0	I	G			Factor (%)	score	test in week	of work in week	scheduled in week	of resit in week
TOETS01 (VT)		Х	Х	Х		portfolio	4.1N,4.2P,4.3O,4.4A,7.1Q	100%	5.5	BW 8 of	BW 9 of	BW 10 of	< 10 workday
block block 1,2,3 block 1,2,3 1,2,3 & 4 & 4 & 4													

Block 13 / Semester 7 – Business IT Consultancy														
CU75044V1	Titl	<b>e:</b> Cha	nge, Y	'es you	Can (	CYC)	Number of study credits:	5	Contact	<b>hours:</b> 40	Manda	tory: Yes	Teaching langua	age: NL
Conditions for a	ours	e parti	icipati	on: no	ne									
Conditions for test participation: none														
•	<i>l witl</i> ratu	h resist	tance,				skills in the field of convers who does not listen, etc.).	The hard skills	•		•		an implement th	
	v	w	0	1	G				tor (%)	score	test in	of work in		of resit in week
	-		-	-	-						week	week	in week	
TOETS01 (VT)	Х			Х		Assessment	7.3K		50%	5.5	BW 8 or 9	≥5 WD	BW 10	< 10 WD
TOETS02 (VT)		Х		Х		Report	2.2K		50%	5.5	BW 8 or 9	≥5 WD	BW 10	< 10 WD

Block 13 / Semester 7 – Business IT Consultancy															
CU75043V1	Titl	e: Ma	king B	usiness	Intel	ligent (MBI)	Numbe	er of study credits: 5	0	Contact	hours: 15	Manda	tory: Yes	Teaching langua	age: NL
Conditions for course participation: none															
Conditions for test participation: none															
Brief descriptio	n of e	course	conte	nt: In	terms	s of content, various	s (advan	ced) data sets are used in th	is cours	se to ult	imately displa	y self-invent	ed KPIs in a E	BI report.	
Compulsory lite	ratu	re: noi	пе												
Test code	For	mat				Assessment type		Content	Weig	hting	Minimum	Planning	Inspection	Resit	Inspection
	v	w	0	-	G				Facto	or (%)	score	test in	of work in	scheduled	of resit in week
	v		U	•	5							week	week	in week	
TOETS01 (VT)	X	Х		Х		Portfolio + option	ial	2.1E,2.1F,2.2C,2.3A,2.3B	10	0%	5.5	BW 8 or 9	≥5 WD	BW 10	< 10 WD
						assessments									

CU75048V2	Tit	le: Gro	aduati	on Pre	parati	ion (GPR) Nu	nber of study credits: 5	Contac	<b>t hours:</b> 15	Mandato	ry: Yes 🛛 🕇	Feaching language: N	L
Conditions for	cours	se part	icipat	i <b>on:</b> n	one	·		<u>.</u>					
Conditions for	test p	partici	pation	: the s	studer	nt is allowed to take the	test when allowed course	e participation of (	CU75066V1				
•							e prepared on their gradu tudent, guidance in writin		•		-		
tools.	ung	u yruc	uutioi	rcomp	uny ti		itudent, guluance in writin	ng a graduation pr	oposar ana gu		y u yruuuutio	in plan including reset	
Compulsory lit	eratu	ire: no	ne										
	1	re: no rmat	ne			Assessment type	Content	Weighting	Minimum	Planning	Inspection	Resit scheduled	Inspection
Compulsory lit Test code	For	rmat				Assessment type	Content	Weighting Factor (%)	Minimum score	Planning test in	Inspection of work in	Resit scheduled	Inspection of resit in
	1		ne O	1	G	Assessment type	Content		-	Ŭ	•		•
	For	rmat		I X	G	Assessment type Graduation proposal	7.5A		-	test in	of work in		of resit in
Test code	For	rmat W		I X	G			Factor (%)	score	test in week	of work in week	in week	of resit in week

<sup>57</sup> P/NP stands for Passed/Not Passed.

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CU75066V1	Tit	le: Co	omple	ex Pr	oject	BIC (CPBIC)	Number of study credits: 15		Contact	: <b>hours:</b> 100	Mandato	ry: Yes T	eaching langua	age: NL
Conditions for	r cou	rse pa	artici	patio	on:							<u>.</u>		
• The student	is in	posse	ession	of t	he pr	opaedeutic certij	ficate of the HBO-ICT program;							
• The student	has d	obtair	ned a	t lea	st 60	EC from the mai	n phase with completed courses;							
• The student	has p	oasse	d the	inte	rnshi	p (CU75035V2)58								
Conditions for	r test	part	icipat	ion:	none	2								
							student will do a complex project in a small		sining of	uncis uno	enperior m	e p. oject ana j	s. sjessional pi	
Compulsory li	terat	ture:		. The	e forr	<b>,</b>	the results are similar with the graduation			<b>R</b> 4 1 - 1	Diamina		Dit	
Compulsory li	terat			. The	e forr	n and account of Assessment	Content	Wei	ghting	Minimum	Planning	Inspection	Resit	Inspectio
Compulsory li	terat	ture:		I ne	e forr	<b>,</b>	5	Wei	ghting or (%)	Minimum score	Planning test in week	Inspection of work in week	Resit scheduled in week	Inspectio of resit in week
Compulsory li Test code	terat	ture: rmat	none	I N	<u> </u>	Assessment	5	Weig Facto	• •		test in	of work in	scheduled	of resit in
Compulsory li Test code	terat Foi V	ture: / rmat W	none	1	G	Assessment type	Content	Weig Facto	or (%)	score	test in week	of work in week	scheduled in week	of resit ir week
Compulsory li Test code	terat Foi V	ture: / rmat W	none	1	G	Assessment type Portfolio +	Content 7.1M,7.1N,7.3M	Weig Facto	or (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of	of resit ir week
De specific for Compulsory li Test code TOETS01(VT) TOETS02(VT)	terat Foi V	ture: / rmat W	none	1	G	Assessment type Portfolio +	Content 7.1M,7.1N,7.3M	Weig Facto	or (%)	score	test in week BW 8 of	of work in week	scheduled in week BW 8 of B14 or B15	of resit in week

<sup>58</sup> Students may submit a request for participation without internship, based on their obtained minor results and will be judged by examiners.

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CU75051V1	Tit	e: Gr	aduc	tion	Busi	ness IT Consultar	ncy (GBIC) Number of study	y credits: 30	Conta	ct hours: 5 Ma	indatory: Yes	Teaching langua	age: NL
Conditions for	<sup>,</sup> cou	rse pa	rtici	oatio	n:								
• The student	is in	oosse	ssion	of th	ne pr	opaedeutic certij	ficate of the HBO-ICT program;						
•The student	has o	btain	ed at	leas	t 137	7.5 EC from the m	nain phase with completed cour	ses.					
Conditions fo	r test	parti	cipat	ion:	As in	cluded in Gradue	ation Student Manual on the gro	aduation Learn pag	е.				
are qualitative Final results w	e suff vill be	icient prese	prof ntea	essio	nal s	oftware enginee	their graduation on a complex p ring products, supplemented wi nt of two examiners and possibl	ith an account of th	e methodical an				
Compulsory li	terat	ure: r	ione								-		
Test code	Fo	mat				Assessment	Content	Weighting	Minimum	Planning	Inspection	Resit scheduled	Inspectio
	v	w	0	I	G	type		Factor (%)	score	test in week	of work in week	in week	of resit in week
				Х		Portfolio +	7.10,7.1P,7.30	80%	5.5	7 of block 16 or	≥5	BW 10 of block	< 10
TOETS01(VT)	Х	Х		^			7.10,7.11,7.30	0070	5.5	7 01 DIOCK 10 01	25	BAA TO OL DIOCK	< 10
TOETS01(VT)	X	х		^		assessment	2.1J,2.2F,2.3E,2.4D,2.5C	0070	5.5	block 1,2,3,4 in	25 workdays	16 or BW 7 in	
TOETS01(VT)	X	х		^				0070	5.5		-		
TOETS01(VT)	х	х		^				0070	5.5	block 1,2,3,4 in	workdays	16 or BW 7 in	workday
	x	x		^ X				20%	5.5	block 1,2,3,4 in	workdays	16 or BW 7 in block 1,2,3,4 in	
TOETS01(VT) TOETS02(VT)	x					assessment	2.1J,2.2F,2.3E,2.4D,2.5C			block 1,2,3,4 in the next year. <sup>59</sup>	workdays for resit	16 or BW 7 in block 1,2,3,4 in the next year <sup>60</sup>	workday
	x					assessment	2.1J,2.2F,2.3E,2.4D,2.5C			block 1,2,3,4 in the next year. <sup>59</sup> 9/10 of block 16	workdays for resit ≥5	16 or BW 7 in block 1,2,3,4 in the next year <sup>60</sup> BW 12 of block	workday

Determined by Executive Board: 12/07/2022

<sup>&</sup>lt;sup>59</sup> One block after the starting block of the course.

<sup>&</sup>lt;sup>60</sup> At the latest 2 blocks after the starting block of the course.

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## 2.2.6 HZ Personality (article 3.12 CER HZ Ba ft)

Free composition space is included in the educational program of the ICT program. For the 2021-2022 cohort, this concerns a total of 11.25 ECTS, in accordance with the minimum of 10 credits art. 3.12 OER HZ. In the IT program we name these courses IT personality (ITP).

With this learning path, HZ offers students the opportunity to personalize their own development during their study time, it increases the possibilities to broaden domain-transcending domains and stimulates broad social involvement. The student is responsible for filling in these free credits; in consultation with the ITP coordinators of the study program, he/she makes a proposal for interpretation within the established frameworks. Free credits are included in a certain place in the study program (see study program schedules under 2.2.3), but a student is free to enter the free credits at any time. These ITP courses are conform the policy document HZ Personality.

## 2.2.7 Specialisations (article 3.10 CER HZ Ba ft)

Cohorts 2017–2018 and newer.

The HBO-ICT program offers 3 specific tracks. These are called study tracks. Each of these tracks consists of a compulsory part of a specific internship, a specific specialization semester and finally a specific graduation project. In addition, it is recommended to choose a matching minor. Specifically, it concerns the following tracks:

- Software engineering (SE)
- Data science (DS)

• Business IT consultancy (BIC)

Students choose between 2 of the three tracks in consultation with a lecturer/coach during year 2, block 5. The definite choice of one of these tracks will be during year 2, block 7. The study career coach is providing track specific information before the choice has to be made.

## 2.2.8 Internship (article 3.9 CER HZ Ba ft)

It is mandatory students do their internship corresponding to their chosen track choice. Registering for a different internship will imply the student chooses for another track choice and thus needs to fulfil the applicable courses and finished track dependent courses will become extracurricular.

For information on the graduation/graduation internship, securing an internship and its assessment, please refer to the Graduation or internship course on learn which provide the student information and instruction.

## 2.2.9 **Minor** (article 3.8 CER HZ Ba ft)

No additional requirements for advancement have been formulated for the minor.

If a student wishes to participate in a minor outside their own study program at a higher education institution or university in the Netherlands or abroad, prior permission from the partial examination board is required. The partial examination board checks whether the student has adequately justified the objectives and level of the minor to be chosen and whether the objectives and level of the minor to be chosen and whether the participation conditions are met as stated in article 3.8 CER HZ Ba ft.

## 2.2.10 **Participation in international exchange programme** (article 4.5 CER HZ Ba ft) The programme does participate in an international exchange programme.

Within the HBO-ICT program there are opportunities to gain international experience during the internship, the minor or the graduation (blocks 9 & 10, 11 & 12, 15 & 16).

2.2.11 Graduation (article 3.9 CER HZ Ba ft)

In order to participate in the graduation phase of the HBO-ICT programme (semester 8), the student has to have no more than 12,5 ECTS unpassed, besides the 30 ECTS of the graduation phase. The actual graduation manual (learn page) is applicable for each student, starting a graduation.

For information on the graduation/graduation internship, securing an internship and its assessment, please refer to the Graduation or internship course on learn which provide the student information and instruction.

#### 2.2.12 Transition arrangement (art. 6.2 paragraph 11 HZ CER)

Transitions of previous years that ended last cohort, are to be handled manually per student.

Old					New
Course name	Short	ECTS	CU	Version	Note
Digital Innovation project	DIP	7,5	75070	1	Tested by User Value Exploration (CU75076) $\rightarrow$ tests 1 & 3
Digital Transformation project	DTP	5	75071	1	Stays available for testing during 2021-2022
Design Thinking	DTH	2.5	75019	1	Tested by User Value Exploration (CU75076) $\rightarrow$ test 2

#### 2.3 Study recommendation

2.3.1. **Conditions for registration for programme after NBSA** (article 8.1, paragraph 9 HZ CER Ba ft) Students who receive a negative binding study advice for the bachelor HBO-ICT at HZ University of Applied Sciences cannot register for the bachelor program HBO-ICT within three years at HZ University of Applied Sciences.

#### 2.4 Experiment (article 9.4 CER HZ ba ft)

2.4.1 This year, the programme is participating in an experiment under the pilot project group Flexibilisation. The programme would like to experience the results of participation in this project. Students are not affected by this. For further explanation, please see the programme page on HZ Learn.

# **CHAPTER 3 ESTABLISHMENT**

- 3.1.1 The duration of the implementation regulations is the same as the duration of the HZ Education and Examination Regulations Bachelor programme full-time 2022-2023.
- 3.1.2 These Course and Examination Regulations were established by the Executive Board on 12/07/2022.

# Appendix 1

## Program profiles for the tracks from cohort 2017-2018 and newer.

## Program profile for SE track

	Analysis	Design	Realisation	Advise	Manage & Control
User Interaction	2	2	2		
Organisational Processes	2	1		2	
Infrastructure		2	1	2	2
Software	3	3	3	3	3
Hardware Interfacing	1				
Data Science	2	2	2	2	-
Professional Skills	3	2	3	3	

## Program profile for DS track

	Analysis	Design	Realisation	Advise	Manage & Control
User Interaction	2	2	2	2	
Organisational Processes	2	1		2	
Infrastructure		2	1	2	2
Software	2	2	1-2		3
Hardware Interfacing	1				
Data Science	3	3	3	3	-
Professional Skills	3	2	3	3	

## Program profile for BIC track

	Analysis	Design	Realisation	Advise	Manage & Control
User Interaction	2	2	2	2	
Organisational Processes	3	3	2	3	3
Infrastructure			1		2
Software	2	2	1		3
Hardware Interfacing	1				
Data Science	2	2	2	2	-
Professional Skills	3	3	3	3	