Implementation Regulations CER HZ

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Chapter 1 General provisions Implementation Regulations CER HZ

1.1 General

1.1.1 The Education and Examination Regulations (CER HZ) comprise the core of the education within HZ. That document gives a general overview of all study programmes offered by HZ. The CER HZ contains institution-specific regulations, which apply to the entire HZ. Every year, the Executive Board determines the institution-specific Implementation Regulations CER HZ (hereafter: Implementation Regulations) for every study programme. The study program Information & Communication Technology (hereafter ICT) is registered (CROHO) as HBO-ICT

1.2 Programme Committee

1.2.1 The Programme Committee is provided the opportunity to advise the Executive Board before the Implementation Regulations are determined.

1.2.2 The Programme Committee assesses the execution of the Education and Examination Regulations and the Implementation Regulations annually.

1.3 Director

1.3.1 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 CER HZ per study programme: ICT, full-time

2.1 Registration, pre-training requirements and admission policy

2.1.1 Overview additional pre-training requirements (article 2.3 CER HZ in addition to the requirements as stated in article 2.2 CER HZ)

Legend
√ Admissible
X Not admissible

Profiles senior general secondary education	NT (Nature & Technology)	NH (Nature & Health)	ES (Economy & Society)	CS (Culture & Society)
Student graduated from senior general secondary school before 1-8-2009	√	√	√	√
Student graduated from senior general secondary school after 1-8-2009	√	√	√	√

Profiles pre-university education	NT (Nature & Technology)	NH (Nature & Health)	ES (Economy & Society)	CS (Culture & Society)
Student graduated from pre-university before 1-8-2010	√	√	√	√
Student graduated from pre-university after 1-8-2010	√	√	√	√

All domains of secondary vocational education (Dutch: mbo-*domeinen)* do have direct access to all *sectors* of Universities of Applied Sciences (in Dutch: hbo-sector)

2.1.1.1 International enrolment 240 EC track (article 2.2, 2.3 2.8 CER HZ)

- 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.

2.1.2 Deficiency test (article 2.4 OER HZ)
The holder of a diploma that does not meet the admission requirements (deficiency) (see article 2.1.1.) can be admitted on the condition that the requirements for the contents are met by means of a deficiency investigation. The deficiency investigation for the study programme 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.

2.1.3 Additional requirements (article 2.5 CER HZ)
No additional requirements apply to the ICT programme.

2.1.4 Admission requirements for the study circle of the part-time study programme (article 2.6. CER HZ)
The ICT programme does not have a part-time programme.

2.1.5 Admission requirements for the study circle of the dual study programme (article 2.7. CER HZ)
The ICT programme does not have a dual programme.

2.2 Organisation of the study programme and education, addendum to the certificate

2.2.1 Study programme profile (article 3.2 CER HZ)

The study programme profile of ICT is based on the domaindescription Bachelor of ICT of HBO-I (Hoger Beroepsonderwijs ICT-opleidingen/Applied higher educational ICT-programs)[1].
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 holts 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. At this moment a taskforce (in which we are participating) 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.

The main focus of the programme is solving problems or improving processes, either individually or in a group, by using ICT. There in 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 typically for the Dutch and Zeeuwse (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 live 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 live on a structural basis. ICT can be used for good and for worse. Our 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, Teamlead, 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.

[1] Based on the version of 2018 retrieved from https://hbo-i.nl/domeinbeschrijving/ (retrieved, March 24, 2020).

2.2.2 Competences (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 some information (for example Figure 1) are described in English but the Dutch version is added in the attachments. 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 • Analysis • Advise • Design • Realisation • Manage & Control	what does an ICT professional do?
ICT-architectural layers • User interaction • Organisational Processes • Software • Infrastructure • Hardware interfacing • Data science	within which context?
Proficiency levels [2]	how complex is it?

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

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

[2] 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.

2.2.2.1 Cohorts 2019-2021 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) tis 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 busines (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. The numbers of each cross section indicates the level of education within our program. If a range is indicated this means, depending on the profile of choice the minimum and maximum level.

	Annalysis[3][4]	**Design[5][6]**	**Realisation[7][8]**	**Advise[9][10]**	**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.

[3] For DS this is: Set up a DS process
[4] For PSK this is:Personal Leadership
[5] For DS this is: Collect and Adress relevant data
[6] For PSK this is: Targeted Interaction
[7] For DS this is: Evaluate and Deploy results
[8] For PSK this is: Future-oriented Organisation
[9] For DS this is: Perform Data Analysis
[10] For PSK this is: Investigative Problem Solving

2.2.2.2 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.

Older programmes are transposed to this curriculum.

	Annalysis[11][12]	Design[13][14]	Realisation[15][16]	Advise[17][18]	Manage & Control	Agile[19]
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

Figure 3: Program profile from cohort 2017-2018 till 2019-2020

2.2.2.3 Competences cohorts 2020-2021 en newer

[11] For DS this is: Set up a DS process
[12] For PSK this is:Personal Leadership
[13] For DS this is: Collect and Adress relevant data
[14] For PSK this is: Targeted Interaction
[15] For DS this is: Evaluate and Deploy results
[16] For PSK this is: Future-oriented Organisation
[17] For DS this is: Perform Data Analysis
[18] For PSK this is: Investigative Problem Solving
[19] 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.

1. User interaction	
1.1 analyse	
A	You can define important consequences for the UX based on the characteristics of a target group [B6]
1.2 Design	
A	You can formulate a suitable UX research approach [B6]
1.3 Realise	
A	You can apply design guidelines and corporate branding when realising a simple interaction within an information system [B3]
B	You can realise a simple interaction within a team while taking into account consistency and standards [B3]
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 complexe functions within an application [B4]
F	You can take into account suitable design guidelines in UX [B6]
G	You can take into account human factors in UX [B6]
H	You can take into account emotional design in UX [B6]
I	You can test and improve your digital solution on UX aspects (B7)
J	You can design a testplan report your digital UX solution (B7)
1.4 Advise	
A	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]
B	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]
2. Organization processes	
2.1 analyse	
A	map, according to the given methodolody, the current situation of a singular company process (IST) [B3]
B	analyse the performance of an organization through a standard methodology. [B7]
C	map an organization process of an existing organization by using suitable methodologies. [B7]0
D	you assess a given situation on various security aspects. [B7]
E	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]
H	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 thet 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]
K	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]
B	you can map sound change strategies, so that you can choose the right strategy for the right change/company in a methodical way. (B13)
C	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	
A	you create KPIs for a dataset that you substantiate yourself and create a matching BI report. (B14)
B	you carry out the entire process from importing the data to creating the report. (B14)
C	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]
E	You independantly realise an implementation(plan) and test the acceptance in a complex context. [S8]
2.4 Advise	
A	you submit a sound analysis report based on a company organization analysis. [B7]
B	You can independently give throrough organizational advice by using ICT possibilities in the context of an internship. [INTERSHIP BIC]
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 company. [S7]
D	You can independently give a sound organizational advice for implementing ICT possibilities in a complex context. [S8]
E	Students understands how a companies data maturity fits in a broader context of data strategy [B6]
F	Students can advise about the future perspective of data driven business. [B6]
2.5 Manage & Control	
A	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.
B	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]
C	You can independently draw up a control plan for ICT processes in a complex context. [S8]
3. Infrastructure	
3.1 analyse	
3.2 design	
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]
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]
4. Software	
4.1 analyse	
A	(group) you detemine the systems context of a system to be developed [B3]
B	(individually) you collect relevant data from one single requirement's source through a given elicitation technique [B3]
C	(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]
H	You can develop empathy for all parties involved in a complex problem [B5]
I	You can define a problem through an analysis of all available data [B5]
J	You can genenerate a lot of (innovative) ideas for a defined problem [B5]
K	You can make a prototype of an chosen idea. [B5]
L	You can carry out tests based on the prototype and thus generate new insights. [B5]

M	you can map the trust boundaries of a complex system. (B14)
N	You can independently make an analysis of a software engineering design problem in an internship context. [INTERNSHIP SE]
O	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]
P	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]
4.2 design	
A	you design a database of a simple information system and document this by means a standard modelling technique [B3]
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]
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]
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]
~~H~~	~~You can make a channel strategy and know how to reach your customers. [B6]~~
I	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]
K	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]
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)
P	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]
4.3 Realise	
A	You can realise a simple function within given concepts of a Framework [B3]
B	You can test a software system based on a Framework on the own work environment [B3]
C	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]
H	you write readible, 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]
K	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]
M	you apply the right combination of programming techniques for the problems in a complex software system.(B13)
N	you perform a security audit through a given model. (B14)
O	You can independently realise a suitable solution for a software engineering design problem in an internship context. [INTERNSHIP SE]
P	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 independantly realise a suitable solution to a software engineering design problem in a complex context, independently. [S8]
4.4 Advise	
A	You can independently give a suitable advice for solving a software engineering design problem in an internship context. [INTERNSHIP SE]
B	you write a suitable advice on the results of a security research that was held. (B14)
C	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]
E	You independantly give a suitable advice for solving a software engineering design problem in a complex context. [S8]
4.5 Manage & Control	
A	You can organize and use tools to exchange code and documentation within a team [B3]
B	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]
H	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]
K	you ensure confidentiality of a data set by applying cryptography [B7]
5. Hardware Interfacing	
5.1 analyse	
A	you describe the foundations of a computer system [B1]
6. Data Science (Cisp-DM Cycle)	
6.1 You set up a data Science process	
CRISP-DM phase(s): Business Understanding + Data Understanding	
A	You can define and report the customers organisation and its problem [B7]
B	You can define & provide data mining goals [B7]
C	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]
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. (B14)
J	You describe data mining activities based on choice of the best applicable machine learning model and relevant required activities [S7]
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 are capable of converting data in correct formats to visualize data [B7]
G	You (re-)validate data after model generated assumptions [B8]
H	You clean data by imputating and scaling revelant data [B8]
I	You construct data by one-hot-encoding, defining targets & labelling relevant data [B8]
J	You integrate relevant data by merging multiple data sources [B8]
K	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]
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 techniques [S7]
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]
H	You build a model taking feature selection, model tuning, bias, variance over/under fitting & learning curves into account [S7]
I	You asses your model outcome using advanced metrics and graphical aids [S7]
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	
A	You summarise and evaluate results with business objective(s) [B7]
B	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]
I	You determine the next steps in a additional data science process cycle providing a conclusion supplemented with recommendations [S7]
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]
O	you can independently in a complex environment employ the right professional skills to complete a project successfully (S8)
P	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]
7.2 show personal leadership. Year 1=Level 1 (Context: structured, predictable, known solution Content: Some of the basic concepts). Year 2 = Level 2 (Context: structured, 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]
K	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 behavior to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals, community goals and personal goals.
M	Developing skills and behavior to achieve personal and professional goals. Carrying out activities that contribute to sustainable development goals through participation in a project week.
N	Developing skills and behavior to achieve personal and professional goals. Carrying out activities that contribute to personal goals through participation in an international week.
O	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.

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: structured, 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
B	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)
H	You can read english for orientation (B2/C1)
I	You can write formal english texts (B2/C1)
J	You can give in english an verbal presentation
K	you can communciate 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]
M	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]
N	You can report and present professionally, both verbally and in a report [S8]
O	You deliver structured products, account for the method followed and evaluate the process and the product critically. [S8]
P	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.
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 (Context: 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.
M	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.
O	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.
P	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 (Context: 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 is works and validate it by using an expert and reliable scientific resources.

D	Gives evidence that your problems / challenges to identify and put in context (department / organization / business environment, social environment) and can analyze these problems. You are able, where appropriate and relevant to search for multiple solutions.
E	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.
F	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 Organisation study programme (article 3.3, 3.13, CER HZ)

Organisation of the study programme:	
National name:	B HBO-ICT
International name:	B Information & Communication Technology
Degree:	Bachelor of ICT, BSc-ICT
Duration of study:	4 jaar/ 4 years
Study load propedeutic phase	60 EC
Study load main phase:	180 EC
Form:	Voltijd/Fulltime
Croho-code:	30020
Location:	Middelburg
Languages:	Nederlands/ English
Date start accreditation:	29 juni 2018
Final date accreditation:	28 juni 2024
Associate degree:	No
Combined study programma:	No
Accelerated course higher professional education (pre-university)	No

2.2.3.1 Programme 240 EC

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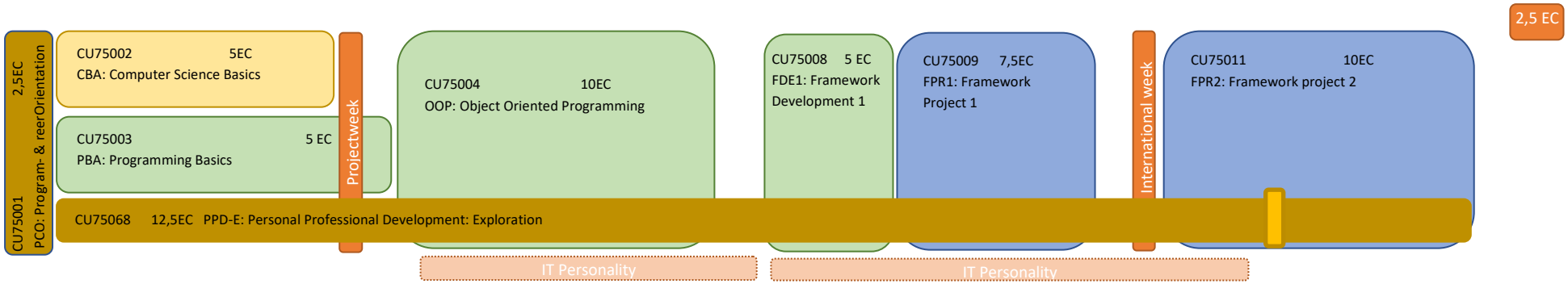
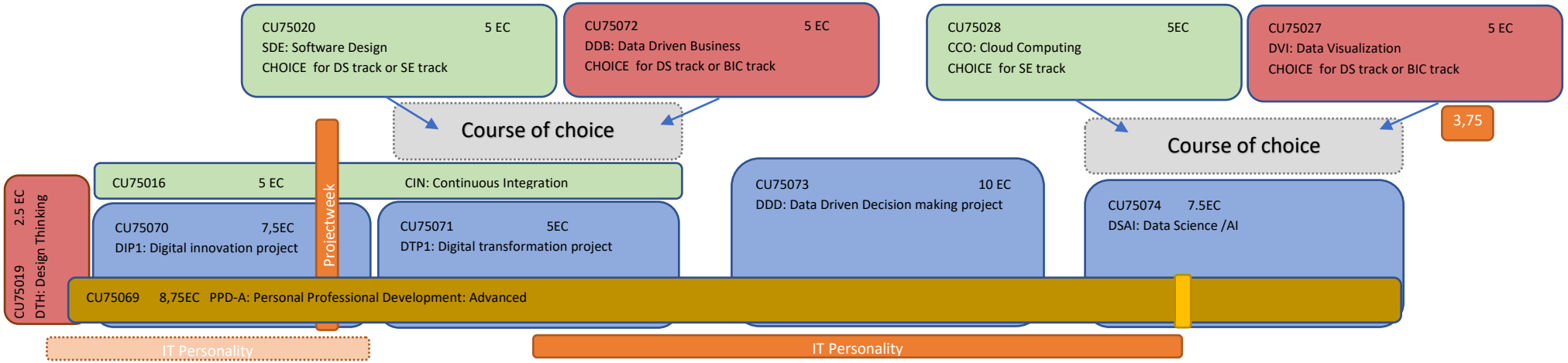
PROPEDEUTIC PHASE (YEAR 1)

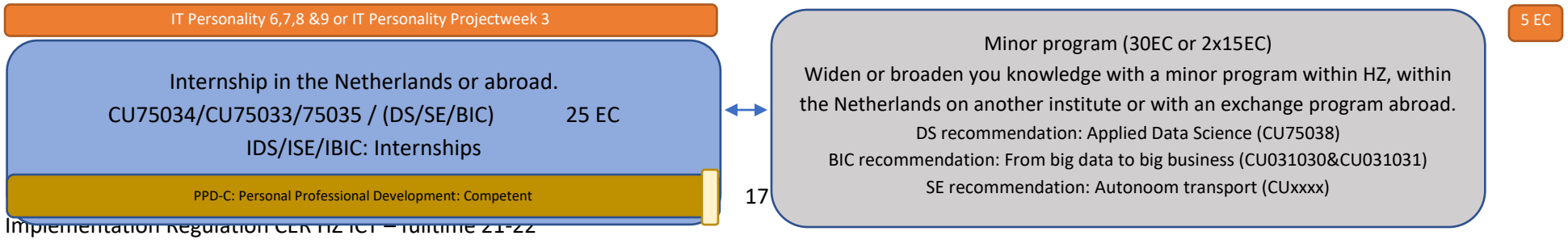


MAIN PHASE

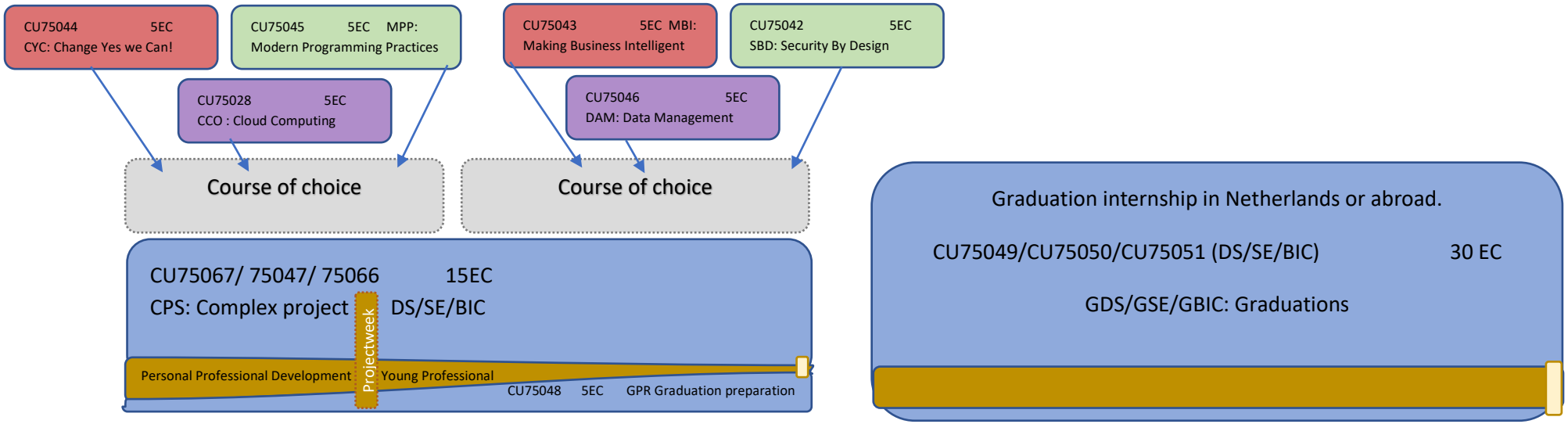
YEAR 2



YEAR 3



YEAR 4



IT PERSONALITY TOTAL OVERVIEW

Total 11,25 IT Personality 9 van de 13 units van 1,25 EC All 3 categories at least	Year 1 (2 out of 4):CU75056(ITP1), CU75057(ITP2), CU75054(PPW1), CU75068(PIW) Year 2 (3 out of 4):CU75058 (PPW2), CU75059(ITP3), CU75060(ITP4), CU75061(ITP5) Year 3 (4 out of 5): CU75062(ITP6),CU75063(ITP7),CU75064(ITP8),CU75065(ITP9),CU75075(PPW3)

The courses of IT personality are mapped on HZ personality, some extra IT focused possibilities are added. Therefore this course is covering the 10 credits HZ personality as mentioned in the OER.

2.2.3.2 Doorstroom (article 3.3 paragraph 4 sub I (specifically in Dutch)

This article is specifically written in Dutch because AD students can only be Dutch.

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. Voor deze studenten geldt de gebruikelijke procedure rondom het aanvragen van vrijstellingen volgens het vrijstellingenbeleid.

2.2.3.3 Language

The study programme adheres to the following rules with regard to the language:

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 group and the common language is English. Written or digital tests will take place in two separate groups, Dutch and English. All individual hand in tests (like portfolio or reports) are delivered in English or Dutch depending in which stream the student is.

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 (DTH CU75019V1) and the two courses of choice; 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 exemption 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.

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, with the exception of the work placement / graduation phase at the request of the work placement company / company where the student completes his graduation. Cohorts up to and including 2019-2020 2nd, 3rd and 4th year: The language of instruction and examining is Dutch. With the exception of the work placement / graduation phase at the request of the work placement company / company where the student completes his graduation.

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.

2.2.4 Courses propaedeutic phase (article 3.5, 3.11 CER HZ)

Abbreviations used in the course tables:

O	Oral exam
W	Written exam
OT	Other test
I	Individual test
G	Group assessment

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Semester 1 – Block 1 – Computer Science

CU75001V3	**Title:** *Program- & Career Orientation (PCO)*	**Number of EC's:** 2,5	**Contact hours:** 56	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: students learn to know eachother, the teachers, the program and the career opportunities. Based on this knowledge the student can supported by examples and/or reflections draw some conclusions for the rest of their own study. Student will start with hands on practise. Build a Webpage in which the student introduces him/herself to the program and explains his/her motivation.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X	X	X		Portfolio based assessment	7.2K	100%	5.5	2 or 3 of the block	≥5 workdays for resit	Block-week 8 or 9	< 10 workday

CU75002V2	**Title:** Computer Science Basics (CBA)	**Number of EC's:** 5	**Contact hours:** 45	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Basic ICT-knowledge, like what computers are and how they work (together). Contains computer history, basic concepts like compilers, computational thinking, number structures and data structures. Basic understanding of an operating system. Subjects like persistency, programmer versus software engineer, client–server.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		written exam	5.1A	100%	5.5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

CU75003V1	**Title:** Programming Basics (PBA)							**Number of EC's:** 5		**Contact hours:** 36		**Mandatory:** Yes		**Language:** NL/EN
Conditions for participation: none														
Special condition for credit allocation: none														
Course summary: your first steps into programming. You learn subjects as: data structures, conditionals, loops and functions.														
Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**	
	O	**W**	**OT**	**I**	**G**									
1		X		X		Case study exam	4.3G,4.3H,4.3I,	100%	5.5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday	

CU75068V1	**Title:** *Personal professional development: Exploration (PPD-E)*	**Number of EC's:** 12,5	**Contact hours:** n/a[20]	**Mandatory:** Yes	**Language:** NL/EN

Conditions for participation: Level determination for language proficiency, on/above entrance level (3F/B2) through Hogeschooltaal (Dutch and English for Dutch track) (English for English track)

Special condition for credit allocation: none

Course summary: General Bachelor-competences, in this case: aspects of written reporting like language provision, style, typography, house style, further layout and referencing. Reporting skills are applied on the subject of game development and combined with further guidance on development as an (international) ICT student on this program. The feedback based improvement can be demonstrated in the second reading and writing assignment.

General bachelor competences in Agile working project groups (by retrospective feedback or self study). In this case: self-steering and (team)learning, methodical judgment, communicational behavior in project groups.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X		Criterium focused assessment based on portfolio	7.2O,7.2P,7.2Q,7.2R 7.3A, t/m, 7.3F 7.4L, 7.4M, 7.4N, 7.4O, 7.4P 7.5D, 7.5E, 7.5F	100%	5,5	3,4 or 5 of block 4	< 10 workday	Block-week 10	< 10 workday

[20] Course completely integrated in all other course content. Rituals needed for project work like stand-ups, sprint planning, retrospectives etc. are used to generate feedback in diverse ways. SLC meetings are used to discuss professional skill progress. And workshops, meetings and InterVision sessions will be planned just in time and on demand. Course improvement will take place during the year through block support moments and block evaluation.

CU75054V1	**Title:** *IT Personality Projectweek 1 (PPW1)*	**Number of EC's:** 1,25	**Contact hours:** variable[21] min:2	**Mandatory:** No, 2 out of 4 from CU75054 CU75055 CU75056 CU75057	**Language:** EN for general communication. NL is possible for personal coaching.

Conditions for participation: none

Special condition for credit allocation: none

Course summary: This course can be followed 3 times during the study programme. Course description for CU75054, CU75058, and CU75075 are identical. IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum. Each year the ICT program organizes a projectweek with real life casus and (if possible) in cooperation with other programs. This projectweek course can be chosen as 1,25 ec content for personality.
The assessment criteria and assessment process are listed in the IT Personality 2021-2022 instruction manual which can be found on the Learn page.
This course is already approved for IT personality, students only need to define their personal goals within the given context.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2M	100%	D/ND [22]	43,44,45,46	47	3	5

[21] Depending on the chosen category (see manual HZ personality) and choices of the student.
[22] D/ND means Done/Not-Done. In Dutch Voldoende/Onvoldoende.

CU75056V1	**Title:** *IT Personality 1 (ITP1)*	**Number of EC's:** 1,25	**Contact hours:** variable[23] min:2	**Mandatory:** No, 2 out of 4 from CU75054 CU75055 CU75056 CU75057	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[23] Depending on the chosen category (see manual HZ personality) and choices of the student.

Semester 1 – Block 2 – Game Development

CU75004v1	**Title:** *Object-oriented programming (OOP)*	**Number of EC's:** 10	**Contact hours:** 70	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Apply object-oriented principles like abstraction, encapsulation, inheritance and polymorphism. First in a theory later in a practical assignment for a external regional client.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X		X		X	presentation	4.3F,4.3G,4.3H,4.3I,4.2E,4.1F	50%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
2		X		X		Case study exam	4.3F,4.3G,4.3H,4.3I	50%	5,5	Blockweek 5	< 10 workday	Block-week 10	< 10 workday

Semester 2 – Block 3 – Modern Software Development

CU75008V1	**Title:** *Framework development 1 (FDE1)*	**Number of EC's:** 5	**Contact hours: 60**	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: The student learns the basics principles and of a specific framework. The student will learn to use a specific framework by setting up a project. Student can realise basic userstories with the help of a given framework.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X	X	X		case study exam	1.3A,4.2B,4.2C,4.3A	100%	5,5	4 or 5 of the block	≥5 workdays for resit	Block-week 9 or 10	< 10 workday

CU75009V3	**Title:** Framework Project 1 (FPR1)	**Number of EC's:** 7,5	**Contact hours: 60**	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Requirements analysis (identify requirements and wishes) and software-development process. Students work in groups on real life SDG related cases within given frameworks. The group portfolio contains the final product delivered by the students. The requirements portfolio contains group material and individual contributions. Furthermore the professional working environment is assessed for each individual student in this assessment knowledge of an integrated development environment (IDE) and the ability is assessed. The student needs to organize it in such a way that it can be cooperated with in a project context when developing software.					

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X			X	Criterium focused assesment based on portfolio and final delivery	1.3B,4.2A 7.4C, 7.4E	33%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
2	X	X		X	X	Criterium focused assesment based on requirements portfolio	2.1A,2.2A,4.1A,4.1B,4.1C	33%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
3	X		X	X		Workplace assessment	4.3B,4.5A,4.5C	33% (2,5 EC)	5,5	6, 7, 8 or 9 of the block	≥5 workdays for resit	Block-week 8, 9 or 10	< 10 workday

Semester 2 – Block 4 - Modern Software Development

CU75011V3	**Title:** Framework project 2 (FPR2)	**Number of EC's:** 10	**Contact hours:** 70	**Mandatory:** Yes	**Language:** NL/EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: The course focuses on the application of the earlier 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 chose (in addition to a general basis) their own personalized theme to deepen or broaden					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X			X	Criterium focused assesment based on portfolio and final delivery	1.3C,1.3D,4.5E 7.4C	25%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
2	X	X		X		Criterium focused assesment based on acceptation test portfolio	4.1D,4.1E,4.1G,4.2D,4.5D,4.5B	25%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
3		X	X	X		IT development portfolio	1.3E,3.3A,4.3C,4.3D,4.3E	50%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

CU75055V1	**Title:** *IT Personality International week (PIW)*	**Number of EC's:** 1,25	**Contact hours:** variable[24] min:2	**Mandatory:** No, 2 out of 4 from CU75054 CU75055 CU75056 CU75057	**Language:** EN for general communication. NL is possible for personal coaching.

Conditions for participation: none

Special condition for credit allocation: none

Course summary: IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum. Each year the ICT program organizes an international week. If possible including a visit in an international city. This international week course can be chosen as 1,25 ec content for personality.
The assessment criteria and assessment process are listed in the IT Personality 2021-2022 instruction manual which can be found on the Learn page.
This course is already approved for IT personality, students only need to define their personal goals within the given context.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2N	100%	D/ND	16, 17	18	22	24

[24] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75057V1	**Title:** *IT Personality2 (ITP2)*	**Number of EC's:** 1,25	**Contact hours:** variable[25] min:2	**Mandatory:** No, 2 out of 4 from CU75054 CU75055 CU75056 CU75057	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[25] Depending on the chosen category (see manual HZ personality) and choices of the student.

2.2.5 Courses main phase (article 3.5, 3.11 CER HZ)

Semester 3 – Block 5 – Digital innovation

CU75019V1	**Title:** *Design thinking (DTH)*	**Number of EC's:** 2,5	**Contact hours:** 50	**Mandatory:** Yes	**Language:** ENG for lectures. Report can be ENG or NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary: Tackle a complex problem with a design sprint in one week. During this sprint we research problems, generate and test ideas with actual end users.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X	X	X	X	Portfolio & presentation	4.1H,4.1I,4.1J,4.1K,4.1L	100%	5,5	3,4 or 5 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

CU75016V1	**Title:** *Continuous integration (CIN)*	**Number of EC's:** 5	**Contact hours:** 28	**Mandatory:** Yes	**Language:** NL/ENG

Conditions for participation: none

Special condition for credit allocation: none

Course summary: Develop a thorough understanding of a version control system (VCS) and learn strategies to incorporate a VCS in effective team collaboration. Setup a complete CI pipeline with an automated build for a given project. Add tests and metric tools like code coverage to control the software quality. Course will be based on several deliverables. The course planning is based on different types of releases. Improved by feedback each deliverable will be part of the final portfolio.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X	X	X		portfolio, assessment	4.5F,4.5G,4.5H,4.5I,4.5J	100%	5,5	8 or 9 of block 6	≥5 workdays for resit	Block-week 10	< 10 workday

CU75069V1	**Title:** *Personal professional development: Advanced (PPD-A)*	**Number of EC's:** 8,75	**Contact hours:** n/a[26]	**Mandatory:** Yes	**Language:** NL/EN

Conditions for participation: Level for English language proficiency, on/above second year level (3F/B2) through Hogeschooltaal

Special condition for credit allocation: none

Course summary: General bachelor competences in Agile working project groups and via CRISP-DM working project groups(by retrospective feedback or self study). In this case: working in a planned manner, showing and coordinating appropriate efforts, motivated cooperation, team-oriented and self-managing actions, self-directed (team) learning, methodical judgments, communicative behavior in a project context.
Project management: the student learns the relationship of project management (PM) to software development and concrete project management methods and methodologies are treated, such as SCRUM Project management. Students apply their PM skills during the projects and show what they have learned by showing deliverables and approving these deliverables by peer-feedback.

Students learn to communicate effectively English in an IT project environment. During the English semester students can practice, receive feedback and need to demonstrate a sufficient level of reading, understanding, writing and presentation skills for practical professional situations.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X		Criterium focused assessment based on portfolio	7.2O,7.2P,7.2Q,7.2R 7.3C, t/m, 7.3J 7.4L, 7.4M, 7.4N, 7.4O, 7.4P 7.5D, 7.5E, 7.5F	100%	5,5	2, 3,4 or 5 of block 4	< 10 workday	Block-week 10	< 10 workday

[26] Same as for PSF CU?

CU75070V1	**Title:** *Digital Innovation Project (DIP)*	**Number of EC's:** 7,5	**Contact hours:** 40	**Mandatory:** Yes	**Language:** NL/ENG

Conditions for participation: Assessment (and thus awarding of the grade) can only take place if the individual has a minimum of 70% positive score on the learn quizes

Special condition for credit allocation: none

Course summary: the project is focused on digital innovation. With the end result of the design sprint student teams will work on delivering the IT solution they come up with for the clients.
During Sprint 0 the students will build the project structure. Deliverables are epics, user stories, definition of done and the backlog. Students will verify all these deliverables with the stakeholders and discuss the impact and technologies proposed. This process will lead to modified user stories and priorities. Student learns to clearly draw up structured (functional) specifications. This methodology is focused on an agile approach.

During the following sprints student will develop their project as a team in an Agile way. Gathering feedback to improve as a team and as an individual. This feedback can be used for the course professional skills [Medior]. Student will use a number of different methods to verify their ideas with the stakeholders. Students will verify the user stories in x from y ways. Verification will be a continuous process.
The focus of this project is on digital innovation for the stakeholders. Students work agile, report progress, improve their effectiveness in their team and deliver a suitable solution to the clients. During the project they continuously evaluate their progress and report that to the stakeholders and studycoach.
Students will deliver their solution as a product demo. Furthermore they deliver a final innovation clip (video) students will address the technological innovations they used or researched and they also share this in a presentation in a technical knowledge session.
The deliverables can be improved by the feedback received in the sprint delivery's. The final portfolio consists of the deliverables, the end result, the knowledge clip and the demo.

During sprints 1 and 2 the student are introduced to the theory of User experience (UX) principles, this forms the basis for the following block.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X	X	Portfolio based presentation and optional assessment	4.2F, 4.2G 4.2J,4.2K, 4.2M, 4.2I, 7.3P 1.1A,1.3F,1.3G,1.3H	60%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
2	X				X	Innovation clip	7.5C, 7.3Q	20%	5,5	7, till 10 of the block	< 10 workday	latest block10 next block[27]	< 10 workday
3	X				X	Demo presentation	7.3R	20%	5,5	7, till 10 of the block	< 10 workday	latest block10 next block[28]	< 10 workday

CU75058V1	**Title:** *IT Personality Projectweek 2 (PPW2)*	**Number of EC's:** 1,25	**Contact hours:** variable[29] min:2	**Mandatory:** No, 3 out of 4 from CU75058 CU75059 CU75060 CU75061	**Language:** EN for general communication. NL is possible for personal coaching.

Conditions for participation: none

Special condition for credit allocation: none

Course summary: This course can be followed 3 times during the study programme. Course description for CU75054, CU75058, and CU75075 are identical. IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum. Each year the ICT program organizes a projectweek with real life casus and (if possible) in cooperation with other programs. This projectweek course can be chosen as 1,25 ec content for personality.
The assessment criteria and assessment process are listed in the IT Personality 2021-2022 instruction manual which can be found on the Learn page.
This course is already approved for IT personality, students only need to define their personal goals within the given context.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2M	100%	D/ND	43,44,45,46	47	3	5

[27] In consultation with the lecturer
[28] In consultation with the lecturer
[29] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75059V1	**Title:** *IT Personality 3 (ITP3)*	**Number of EC's:** 1,25	**Contact hours:** variable[30] min:2	**Mandatory:** No, 3 out of 4 from CU75058 CU75059 CU75060 CU75061	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[30] Depending on the chosen category (see manual HZ personality) and choices of the student.

Semester 3 – Block 6 – Digital Transformation

CU75071V1	**Title:** *Digital Transformation. Project (DTP)*	**Number of EC's:** 5	**Contact hours:** 40	**Mandatory:** Yes	**Language:** NL/ENG
Conditions for participation: Assessment (and thus awarding of the grade) can only take place if the individual has a minimum of 70% positive score on the learn quizes					
Special condition for credit allocation: none					
Course summary: Continuing the project from block 5 students work agile, report progress, improve their effectiveness in their team and deliver a suitable solution to the clients. During the project they continuously evaluate their progress and report that to the stakeholders and studycoach. Student develop their solution with a special focus on the impact of their solution on the stakeholders company or process. Students will deliver their solution as a product demo including the transfer. In their final presentation students will address the impact their solution has. Deliverables are reported in a professional portfolio. Final product will be graded by innovativeness, appropriateness, progress, quality and transfer to the client. The students are introduced to the User experience (UX) principles and learns to apply them correctly within their project. Students make up a UX improvement report in which they demonstrate that they can improve the user experience of their projects by analysing the project, making a testplan, testing, evaluating and improvements. The deliverance of the testplan is supplemented with a demo of the UX test technique used. (can be a video or life demo)					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X		X	X	Portfolio based presentation, optional assessment	4.2J,4.2K,4.2L,4.2N,7.3Q,7.3P 1.2A,1.3F,1.3G,1.3H, 1.3I,1.3J	80%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
2	X				X	Demo presentation	7.3R	20%	5,5	7, till 10 of the block	< 10 workday	latest block10 next block[31]	< 10 workday

[31] In consultation with the lecturer

CU75072V1	**Title:** *Data Driven Business (DDB)*	**Number of EC's:** 5	**Contact hours: 24**	**Mandatory:** CHOICE CU75072 or CU75020	**Language:** ENG for lectures. Report can be ENG or NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary: Introduction in "how to become a data driven organization". Students will learn the definition of Data Driven business and why companies want or need to change their business. Students are given tools to determine which companies are data driven. Furthermore they will have understanding in what is needed for companies to become data driven. Additionally, from a maturity point of view, students will be introduced to an exemplary roadmap in which a company may become data driven. In addition, students are given insight in flaws, failures & don'ts of becoming data driven. All aspects of the courses will be backed by reallife cases, so far as possible. Lastly the connection to Data Strategy will be explained, so ensure students understand what the end-goals may look like in a broader overview. Students will work in groups of 3 or 4 (depends on the number of students starting the course)

Exam no.	Form						Contents	Weighting Factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		report	2.1K, 2.4E, 2.4F	60%	5,5	Blockweek 8	< 10 workday	Block-week 10	< 10 workday
2						presentation	2.1K, 2.4E, 2.4F	40%	5,5	Blockweek 9	< 10 workday	Blockweek 10	< 10 workday

Students are capable of understanding the need for business to embrace data and can report what their maturity in this field is

Students understands how a companies data maturity fits in a broader context of data strategy and therefore they can advise about the future perspective of data driven business.

CU75020V2	**Title:** *Software design (SDE)*	**Number of EC's:** 5	**Contact hours: 24**	**Mandatory:** CHOICE CU75072 or CU75020	**Language:** ENG for lectures. Report can be ENG or NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Make software robust! Learn how to detect weak spots in programming code (code smells) and how to solve them (refactoring) with proven solutions like design patterns. Student will learn to Detect design patterns with a tool in an open source software system and will report the result (including class diagram) in a short report. Student will learn to apply refactorings in an open source software system and report their findings and opinion in a blog. Students will Create in pairs a working program that houses multiple design patterns.					

Exam no.	Form						Contents	Weighting Factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		report	4.3J	30%	5,5	4 of the block	< 10 workday	Block-week 10	< 10 workday
2		X		X		Blog	4.3L	30%	5,5	6 of the block	< 10 workday	Block-week 10	< 10 workday
3		X			X	Program	4.3K	40%	5,5	8 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

Semester 4 – Block 7 – Data science

CU75073V1	**Title:** *Data Driven Decision making (DDD)*	**Number of EC's:** 10	**Contact hours:** 44	**Mandatory:** Yes	**Language:** ENG

Conditions for participation: Assessment (and thus awarding of the grade) can only take place if the individual has a minimum of 70% positive score on the learn quizes

Special condition for credit allocation: none

Course summary: Getting acquainted with the iterative Data Science process, in which all the stages of the cycle are completed. The emphasis is on creating insight, based on data, for complex issues. Student work in teams with CRISP-DM methodology on a Data Science project in mixed NL and ENG groups.
Student still work in sprints but follow the steps of CRISP-DM. Python classes are introduced to educate the much needed skill set in data science projects. Deliverables are delivered to the client in a demo and the steps are evaluated. Deliverables are delivered in a professional portfolio.
The first steps are business and data understanding. Therefor students analyse the organisation including organisational processes using standardised methods. Organisational analysis and the first phases of CRISP-DM are combined end the deliverables are delivered in a professional portfolio.
Further students learn to be able to view systems, data and IT solutions from a security perspective. Estimating the impact of data, software and IT related developments on society from an ethical perspective and elaborate about different points of view.

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**O T**	**I**	**G**								
1	(X)	X		X	X	Criterium focused assesment based on portfolio	2.1B,2.1C,2.1D,2.1I,2.4A 6.1A t/m E	30%	5,5	6 of the block	< 10 workday	Block-week 10	< 10 workday
2	X	X		X	X	Criterium focused assesment based on portfolio & final delivery	6.2A t/m F,6.3A, 6.3B,6.3C,6.4A t/m D 7.3Q,7.3P 7.3R, 4.5K	45%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
3	X	X		X	X	Presentation	7.2D	25%	5,5	4 or 5 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

Semester 4 – Block 8 – Data Science

CU75074V1	**Title:** *Data science/ AI [32] (DSAI)*	**Number of EC's:** 7,5	**Contact hours: 32**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: Assessment (and thus awarding of the grade) can only take place if the individual has a minimum of 70% positive score on the learn quizes					
Special condition for credit allocation: none					
Course summary: In this block students continue the project from block 7. Students still work on the data science project for a client Students will complete the iterative Data Science process, in which all the stages of the cycle are completed. The emphasis is on preparation and modelling with the aim to create simple predictive models with machine learning. Students will learn to understand the differences between data science and AI and the stages and applications of machine learning, deep learning etc. Furthermore the project result will be taken into account at the final delivery with an emphasis on the use cloud computing and visualization in the data science project. The final delivery will be supplemented with a poster that summarizes the project steps, results, conclusions (and possible next steps in a visual attractive way. The poster is one of the deliverables in the portfolio. The poster can be used for the professional portfolio of the student.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X	X	X	X	Criterium focused assesment based on portfolio	6.1F,6.1G,6.1H,6.2G t/m K,6.3D,6.3E,6.3F,6.4E t/m H 7.3Q,7.3P	80%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday
	X				X	Presentation (final delivery)	7.3R	20%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

[32] General known abbreviation of Artificial Intelligence.

CU75028V2	**Title:** *Cloud computing (CCO)*	**Number of EC's:** 5	**Contact hours:** 14	**Mandatory:** CU75028 or CU75027	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Use cloud specific building blocks like serverless functions and different kinds of cloud storage, learn how to connect and monitor them, to let your project scale on a new level. Course DVI is mandatory for study track Business IT Consultant Course CCO is mandatory for study track Software Engineer Course CCO & DVI are mandatory for study track Data Science. DVI will take place in year 2 and CCO in year 4.					

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		Research proposal	3.3A,3.4A,3.5A	40%	5,5	4 or 5 of the block	< 10 workday	Block-week 10	< 10 workday
2		X		X		Research report and a proof of concept	3.3A,3.4A,3.5A	60%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

CU75027V2	**Title:** *Data visualization (DVI)*	**Number of EC's:** 5	**Contact hours:** 14	**Mandatory:** CU75028 or CU75027	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Aspects of visual perception, aspects of visualization, data visualization forms and their application, working method to be followed, including substantiated considerations, data visualization means and their use. Course DVI is mandatory for study track Business IT Consultant Course CCO is mandatory for study track Software Engineer Course CCO & DVI are mandatory for study track Data Science. DVI will take place in year 2 and CCO in year 4.					

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		Research proposal	1.4A,1.4B,1.4C,1.4D	40%	5,5	4 or 5 of the block	< 10 workday	Block-week 8	< 10 workday
2		X		X		Research report and a proof of concept	1.4A,1.4B,1.4C,1.4D	60%	5,5	8 or 9 of the block	≥5 workdays for resit	Block-week 10	< 10 workday

CU75060V1	**Title:** *IT Personality 4 (ITP4)*	**Number of EC's:** 1,25	**Contact hours:** variable[33] min:2	**Mandatory:** No, 3 out of 4 from CU75058 CU75059 CU75060 CU75061	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[33] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75061V1	**Title:** *IT Personality 5 (ITP5)*	**Number of EC's:** 1,25	**Contact hours:** variable[34] min:2	**Mandatory:** No, 3 out of 4 from CU75058 CU75059 CU75060 CU75061	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[34] Depending on the chosen category (see manual HZ personality) and choices of the student.

Semester 5 & 6 – Internship & Minor (General courses for all three study tracks)

Students will do 30EC minor in semester 5 and 6. External minors will be registered on the course code mentioned in this section. Internal minor will be registered on their own course code. These course codes are administrated on the Learn page for minors.
Further students will do a 25EC internship in the subject of their study track. These internships are mentioned in the next chapters in the separate study tracks. In addition each student will do 5 EC for IT Personality.

CU75075V1	**Title:** *IT Personality Projectweek 3 (PPW3)*	**Number of EC's:** 1,25	**Contact hours:** variable[35] min:2	**Mandatory:** No, 4 out of 5 from CU75062 CU75063 CU75064 CU75065 CU75075	**Language:** EN for general communication. NL is possible for personal coaching.
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: This course can be followed 3 times during the study programme. Course description for CU75054, CU75058, and CU75075 are identical. IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum. Each year the ICT program organizes a projectweek with real life casus and (if possible) in cooperation with other programs. This projectweek course can be chosen as 1,25 ec content for personality. The assessment criteria and assessment process are listed in the IT Personality 2021-2022 instruction manual which can be found on the Learn page. This course is already approved for IT personality, students only need to define their personal goals within the given context.					

[35] Depending on the chosen category (see manual HZ personality) and choices of the student.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2M	100%	D/ND	43,44,45,46	47	3	5

CU75062V1	Title: *IT Personality 6 (ITP6)*	Number of EC's: 1,25	Contact hours: variable[36] min:2	Mandatory: No, 4 out of 5 from CU75062 CU75063 CU75064 CU75065 CU75075	Language: EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[36] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75063V1	**Title:** *IT Personality 7 (ITP7)*	**Number of EC's:** 1,25	**Contact hours:** variable[37] min:2	**Mandatory:** No, 4 out of 5 from CU75062 CU75063 CU75064 CU75065 CU75075	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[37] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75064V1	**Title:** *IT Personality 8 (ITP8)*	**Number of EC's:** 1,25	**Contact hours:** variable[38] min:2	**Mandatory:** No, 4 out of 5 from CU75062 CU75063 CU75064 CU75065 CU75075	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[38] Depending on the chosen category (see manual HZ personality) and choices of the student.

CU75065V1	**Title:** *IT Personality 9 (ITP9)*	**Number of EC's:** 1,25	**Contact hours:** variable[39] min:2	**Mandatory:** No, 4 out of 5 from CU75062 CU75063 CU75064 CU75065 CU75075	**Language:** EN/NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary:
IT Personality content is based on the HZ-wide programme HZ personality that stimulates the skills concerning and attitudes towards personal development and personal leadership. The programme can either have a broadening or a deepening focus when it comes to the curriculum.
A prerequisite for starting the HZ Personality related activities is having obtained a GO from one of the IT personality coordinators. The assessment criteria and assessment process are listed in the HZ Personality 2021-2022 instruction manual which can be found on the Learn page.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X	X	X		Portfolio	7.2L	100%	D/ND	44, 4, 15, 22	46, 6, 17, 24	44, 4, 15, 22	46, 6, 17, 24

[39] Depending on the chosen category (see manual HZ personality) and choices of the student.

2.3 SPECIALISATION SOFTWARE ENGINEER

Semester 5 & 6– Internship

CU75033V2	**Title:** Internship SE (ISE)	**Number of EC's:** 25	**Contact hours: 20**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- 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).

Special condition for credit allocation: none

Course summary: The internship of the HBO-ICT program aims to: learn to function professionally in a business, ICT-related environment. This is achieved by the student by setting his own learning objectives based on the HBO-ICT professional competences and by reflecting on his own performance. It concerns primarily professional tasks specifically in the field of software engineering.

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X	X	X		portfolio	4.1N,4.2P,4.3O,4.4A,7.1Q	100%	5.5	Week 8 of block 1,2,3 & 4	Week 9 of the block	Week 9 of the block	< 10 workday

Semester 7 – Block 13 & 14 Specialization semester

CU75045V1	**Title:** Modern programming practices (MPP)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In terms of content, advanced programming techniques are cited in this course. Such as concurrency, parallel computing and various programming paradigms. Students must recognize and apply these in controlled, complex assignments.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X	X	X		Portfolio	4.2O,4.3M	100%	5.5	8 or 9 of block 13	≥5 workdays for resit	Block-week 10	< 10 workday

CU75042V1	**Title:** Security by Design (SBD)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In terms of content, various (advanced) security principles are cited in this course. In teams of 3-4 people, students must map and audit an existing, complex system using the given methods and then write appropriate advice about security in the system.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		Advice report	4.1M,4.3N,4.4B,4.4C	100%	5.5	8 or 9 of block 14	≥5 workdays for resit	Block-week 10	< 10 workday

CU75048V1	**Title:** Graduation preparation (GPR)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL or EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In this course the student will be prepared on their graduation. This includes workshops about the transition from student to professional but also guidance on finding a graduation company that is a good fit to the student, guidance in writing a graduation proposal and guidance in writing a graduation plan including research related tools.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		Graduation proposal	7.5A	0%	5.5	8 of block 13	≥5 workdays for resit	Block-week 8 of block 14,15 or 16	< 10 workday
2		X		X		Graduation plan	7.5B	100%	5.5	8 of block 14	≥5 workdays for resit	Block-week 8 of block 15 or 16	< 10 workday

CU75047V1	**Title:** Complex project SE (CPSE)	**Number of EC's:** 15	**Contact hours: 100**	**Mandatory:** Yes	**Language:** NL

Conditions for participation: none

Special condition for credit allocation: none

Course summary: In this course the student will do a complex project in a small group under coaching of lecturers and experts. The project and professional products will be specific for the study track. The form and account of the results are similar with the graduation phase.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X	X	Portfolio + assessment	7.1M,7.1N,7.3M 4.1O,4.1P,4.1Q,4.1R,4.2Q ,4.2R,4.2S,4.3P,4.3Q,4.4D	80%	5.5	8 of block 14	≥5 workdays for resit	Block-week 10 of block 14	< 10 workday
2	X	X			X	Presentation	7.3L	20%	5.5	8,9,10 of block 14	≥5 workdays for resit	Block-week 8 of block 15	< 10 workday

Semester 8 – Graduation

CU75050V1	**Title:** Graduation Software Engineering (GSE)	**Number of EC's:** 30	**Contact hours: 5**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- the student is in possession of the propaedeutic certificate of the HBO-ICT program;
- the student has obtained at least 137.5 EC from the main phase with completed courses.

Special condition for credit allocation: As included in Graduation Student Manual on the graduation Learn page.

Course summary: The students conduct their graduation on a complex practical assignment in a complex situation. The students does this independently. The final products are qualitative sufficient professional software engineering products, supplemented with an account of the methodical and professional approach.
Final results will be presented followed by an assessment of two examiners and possibly one external expert.

Exam	Form	Contents	Weighting	Lowest	Planning	Exam	Planning	Review

no.								factor	passing grade	exam week	review	resit in week	resit in week
	O	W	OT	I	G								
1	X	X		X		Portfolio + assessment	7.1O,7.1P,7.3O 4.1S,4.2T,4.3R,4.4E	80%	5.5	7 of block 16 or block 1,2,3,4 in the next year.[40]	≥5 workdays for resit	Block-week 10 of block 16 or blockweek 7 in block 1,2,3,4 in the next year[41]	< 10 workday
2	X	X		X		Presentation	7.3N	20%	5.5	9/10 of block 16 or block 1,2,3,4 in the next year[40]	≥5 workdays for resit	Block-week 12 of block 16 or blockweek 9/10 in block 1,2,3,4 in the next year	< 10 workday

[40] One block after the starting block of the course.
[41] At the latest 2 blocks after the starting block of the course

2.4 SPECIALISATION DATA SCIENTIST

Semester 5 & 6– Internship

CU75034V2	**Title:** Internship DS (IDS)	**Number of EC's:** 25	**Contact hours: 20**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- 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).

Special condition for credit allocation: none

Course summary: The internship of the HBO-ICT program aims to: learn to function professionally in a business, ICT-related environment. This is achieved by the student by setting his own learning objectives based on the HBO-ICT professional competences and by reflecting on his own performance. It concerns primarily professional tasks specifically in the field of data science

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X	X	X		portfolio	6.1K,6.2Q,6.3J,6.4K,7.1Q	100%	5.5	Week 8 of block 1,2,3 & 4	Week 9 of the block	Week 9 of the block	< 10 workday

Semester 7 – Block 13 & 14 Specialization semester

CU75028V2	**Title:** *Cloud computing (CCO)*	**Number of EC's:** 5	**Contact hours:** 14	**Mandatory:** yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: Use cloud specific building blocks like serverless functions and different kinds of cloud storage, learn how to connect and monitor them, to let your project scale on a new level. Course CCO & DVI are mandatory for study track Data Science. DVI will take place in year 2 and CCO in year 4.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		Research proposal	3.3A,3.4A,3.5A	40%	5,5	4 or 5 of block 13	< 10 workday	Block-week 8	< 10 workday
2		X		X		Research report and a proof of concept	3.3A,3.4A,3.5A	60%	5,5	8 or 9 of the block 13	≥5 workdays for resit	Block-week 10	< 10 workday

CU75046V1	Title: Data management (DAM)	Number of EC's: 5	Contact hours: 15	Mandatory: Yes	Language: NL/ENG
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In this course you will get to know all aspects related to data management based on the DM-Boks. In addition, a number of aspects are chosen that are deepened (think of legal aspects, GDPR, Meta data etc.					

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		Portfolio	6.1I	100%	5.5	8 or 9 of block 14	≥5 workdays for resit	Block-week 10	< 10 workday

CU75048V1	Title: Graduation preparation (GPR)	Number of EC's: 5	Contact hours: 15	Mandatory: Yes	Language: NL or EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In this course the student will be prepared on their graduation. This includes workshops about the transition from student to professional but also guidance on finding a graduation company that is a good fit to the student, guidance in writing a graduation proposal and guidance in writing a graduation plan including research related tools.					

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1		X		X		Graduation proposal	7.5A	0%	5.5	8 of block 13	≥5 workdays for resit	Block-week 8 of block 14,15,16	< 10 workday
2		X		X		Graduation plan	7.5B	100%	5.5	8 of block 14	≥5 workdays for resit	Block-week 8 of block 15 or 16	< 10 workday

CU75067V1	**Title:** Complex project DS (CPDS)	**Number of EC's:** 15	**Contact hours: 100**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In this course the student will do a complex project in a small group under coaching of lecturers and experts. The project and professional products will be specific for the study track. The form and account of the results are similar with the graduation phase.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X		X	X	Portfolio + assessment	7.1M,7.1N,7.3M 6.1J,6.2L t/m P,6.3G,6.3H,6.3I 6.4I, 6.4J	80%	5.5	8 of block 14	≥5 workdays for resit	Block-week 10 of block 14	< 10 workday
2	X	X			X	Presentation	7.3L	20%	5.5	8,9,10 of block 14	≥5 workdays for resit	Block-week 8 of block 15	< 10 workday

Semester 8 – Graduation

CU75049V1	**Title:** Graduation Data Science (GDS)	**Number of EC's:** 30	**Contact hours: 5**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- the student is in possession of the propaedeutic certificate of the HBO-ICT program;
- the student has obtained at least 137.5 EC from the main phase with completed courses.

Special condition for credit allocation: As included in Graduation Student Manual on the graduation Learn page.

Course summary: The students conduct their graduation on a complex practical assignment in a complex situation. The students does this independently. The final products are qualitative sufficient professional data science products, supplemented with an account of the methodical and professional approach.
Final results will be presented followed by an assessment of two examiners and possibly one external expert.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X		Portfolio + assessment	7.1O,7.1P,7.3O 6.1L,6.2R,6.3K,6.4L	80%	5.5	7 of block 16 or block 1,2,3,4 in the next year.[42]	≥5 workdays for resit	Block-week 10 of block 16 or blockweek 7 in block 1,2,3,4 in the next year[43]	< 10 workday
2	X	X		X		Presentation	7.3N	20%	5.5	9/10 of block 16 or block 1,2,3,4 in the next year[40]	≥5 workdays for resit	Block-week 12 of block 16 or blockweek 9/10 in block 1,2,3,4 in the next year	< 10 workday

[42] One block after the starting block of the course.
[43] At the latest 2 blocks after the starting block of the course

2.7 SPECIALISATION BUSINESS IT CONSULTANT

Semester 5 & 6– Internship

CU75035V2	**Title:** Internship BIC (IBIC)	**Number of EC's:** 25	**Contact hours: 20**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- 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).

Special condition for credit allocation: none

Course summary: The internship of the HBO-ICT program aims to: learn to function professionally in a business, ICT-related environment. This is achieved by the student by setting his own learning objectives based on the HBO-ICT professional competences and by reflecting on his own performance. It concerns primarily professional tasks specifically in the field of business consultancy in IT

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X	X	X		portfolio	2.1G,2.2D,2.4B,2.5A,7.1Q	100%	5.5	Week 8 of block 1,2,3 & 4	Week 9 of the block	Week 9 of the block	< 10 workday

Semester 7 – Block 13 & 14 Specialization semester

CU75044V1	**Title:** Change, Yes we can (CYC)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In terms of content, the soft skills in the field of conversation techniques are practiced in this course (how do you deal with a bad news conversation, how do you deal with resistance, how do you deal with someone who does not listen, etc.). The hard skills are researching change strategies, so that you can implement this theory later in the project.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X			X		Assessment	7.3K	50%	5.5	8 or 9 of block 13	≥5 workdays for resit	Block-week 10	< 10 workday
2		X		X		Report	2.2B	50	5.5	8 or 9 of block 13	≥5 workdays for resit	Block-week 10	< 10 workday

CU75043V1	**Title:** Making Business intelligent (MBI)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In terms of content, various (advanced) data sets are used in this course to ultimately display self-invented KPIs in a BI report.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		Portfolio	2.1E,2.1F,2.2C,2.3A,2.3B	100%	5.5	8 or 9 of block 14	≥5 workdays for resit	Block-week 10	< 10 workday

CU75048V1	**Title:** Graduation preparation (GPR)	**Number of EC's:** 5	**Contact hours: 15**	**Mandatory:** Yes	**Language:** NL or EN
Conditions for participation: none					
Special condition for credit allocation: none					
Course summary: In this course the student will be prepared on their graduation. This includes workshops about the transition from student to professional but also guidance on finding a graduation company that is a good fit to the student, guidance in writing a graduation proposal and guidance in writing a graduation plan including research related tools.					

Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1		X		X		Graduation proposal	7.5A	0%	5.5	8 of block 13	≥5 workdays for resit	Block-week 8 of block 14,15,16	< 10 workday
2		X		X		Graduation plan	7.5B	100%	5.5	8 of block 14	≥5 workdays for resit	Block-week 8 of block 15 or 16	< 10 workday

CU75066V1	**Title:** Complex project BIC (CPBIC)							**Number of EC's:** 15		**Contact hours: 100**	**Mandatory:** Yes		**Language:** NL
Conditions for participation: none													
Special condition for credit allocation: none													
Course summary: In this course the student will do a complex project in a small group under coaching of lecturers and experts. The project and professional products will be specific for the study track. The form and account of the results are similar with the graduation phase.													
Exam no.	**Form**						**Contents**	**Weighting factor**	**Lowest passing grade**	**Planning exam week**	**Exam review**	**Planning resit in week**	**Review resit in week**
	O	**W**	**OT**	**I**	**G**								
1	X	X		X	X	Portfolio + assessment	7.1M,7.1N,7.3M 2.1H,2.2E,2.3C,2.3D,2.4C,2.5B	80%	5.5	8 of block 14	≥5 workdays for resit	Block-week 10 of block 14	< 10 workday
2	X	X			X	Presentation	7.3L	20%	5.5	8,9,10 of block 14	≥5 workdays for resit	Block-week 8 of block 15	< 10 workday

Semester 8 – Graduation

CU75051V1	**Title:** Graduation Business IT consultancy (GBIC)	**Number of EC's:** 30	**Contact hours: 5**	**Mandatory:** Yes	**Language:** NL or EN

Conditions for participation:
- the student is in possession of the propaedeutic certificate of the HBO-ICT program;
- the student has obtained at least 137.5 EC from the main phase with completed courses.

Special condition for credit allocation: As included in Graduation Student Manual on the graduation Learn page.

Course summary: The students conduct their graduation on a complex practical assignment in a complex situation. The students does this independently. The final products are qualitative sufficient professional business IT consultant products, supplemented with an account of the methodical and professional approach.
Final results will be presented followed by an assessment of two examiners and possibly one external expert.

Exam no.	Form						Contents	Weighting factor	Lowest passing grade	Planning exam week	Exam review	Planning resit in week	Review resit in week
	O	W	OT	I	G								
1	X	X		X		Portfolio + assessment	7.1O,7.1P,7.3O 2.1J,2.2F,2.3E,2.4D,2.5C	80%	5.5	7 of block 16 or block 1,2,3,4 in the next year.[44]	≥5 workdays for resit	Block-week 10 of block 16 or blockweek 7 in block 1,2,3,4 in the next year[45]	< 10 workday
2	X	X		X		Presentation	7.3N	20%	5.5	9/10 of block 16 or block 1,2,3,4 in the next year[40]	≥5 workdays for resit	Block-week 12 of block 16 or blockweek 9/10 in block 1,2,3,4 in the next year	< 10 workday

[44] One block after the starting block of the course.
[45] At the latest 2 blocks after the starting block of the course

2.2.6 HZ Personality (article 3.12 CER HZ)

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 ECs, 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.

Till cohort 21-22 the courses were named HZ personality and IT personality due to misunderstandings this is changed as from 21-22. 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 HZPersonality.

2.2.7 Studytracks (article 3.10 CER HZ)

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 definit choice of one of these tracks will be during Year 2, Block 7. De SLC is providing track specific information before the choice has to be made.

2.2.8 Work placement (article 3.9 CER HZ)

No additional requirements for advancement have been formulated for the work placement. 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)

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 (sub) examination committee is required. The (sub) examination committee 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 could not also be achieved by taking an HZ minor.

2.2.10 Participation international exchange programme (article 4.5 CER HZ)

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 Graduating (article 3.9. CER)

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.

2.2.14 Transitional arrangement (article 6.2 CER HZ)

Transition since 2020-2021, tests are offered for resits, for one more year during 2021-2022. After this period the possibility for resits for these course will expire.

Old					**New**
Coursename	**Korte naam**	**EC's**	**CU code CU……**	**Version**	**Opm.**
UX design	UXD	2.5	75018	1	Stays available for testing during 2021-2022
Lean Startup 1	LST1	2.5	75040	1	Stays available for testing during 2021-2022
Lean Startup 2	LST2	2.5	75041	1	Stays available for testing during 2021-2022
Afstuderen	Afst	30	6727	13	Stays available for testing during 2021-2022
Professional skills 1	PSK 1	2.5	75005	3	Stays available for testing during 2021-2022, writing assignment and test Hogeschooltaal Together with students of course PPD-E
Professional skills 2	PSK 2	2.5	75006	2	Stays available for testing during 2021-2022 (english test with hogeschooltaal) Together with students of course PPD-E
Professional skills 3	PSK 3	2.5	75010	2	Stays available for testing during 2021-2022 (english test with hogeschooltaal) Together with students of course PPD-E
Professional skills 4	PSK 4	2.5	75013	1	Stays available for testing during 2021-2022 (Projectmanagement test as assignment) Together with students of course PPD-A)
Professional skills 5	PSK 5	2.5	75017	1	Stays available for testing during 2021-2022 (Projectmanagement test as assignment) Together with students of course PPD-A)
Professional skills 6	PSK 6	2.5	75021	1	Stays available for testing during 2021-2022 (english test with hogeschooltaal+assesment) Together with students of course PPD-A)
Professional skills 7	PSK 7	2.5	75026	2	Stays available for testing during 2021-2022 (english test with hogeschooltaal+assesment) Together with students of course PPD-A)
Security & Ethics	SET	2.5	75025	2	Tested as tests 3 of new course DDD
Data Science Introduction 1	DSI1	5	75022	3	Tested as test 2 of new course DDD
Data Science Introduction 2	DSI2	5	75023	3	Tested as test 1 of new course DSAI

Old					New
Coursename	**Korte naam**	**EC's**	**CU code CU……**	**Version**	**Opm.**
Professional Working Environment	PWE	2.5	75007	2	Tested as test 3 of course FPR1
Framework Development 2	FDE2	5	75012	3	Tested as test 3 of new course FPR2
Functional Specifications	FSP	5	75014	1	Stays available for testing during 2021-2022
Business Services	BSE	2.5	75015	1	Tested as test 1 of new course DDD
Framework Project 1	FPR1	5	75009	2	Tested as test 1 and 2 of new course FPR1
Framework Project 2	FPR2	5	75011	2	Tested as test 1 and 2 of new course FPR2
Werk en denkniveau 2b	WEDAG2b	2.5	22134	1	Stays available for testing during 2021-2022
Werk en denkniveau 3a	WEDAG3a	2.5	22144	1	Stays available for testing during 2021-2022
Werk en denkniveau 3b	WEDAG3b	2.5	22147	1	Stays available for testing during 2021-2022
Externe certificering	ECE	2.5	14180	6	Stays available for testing during 2021-2022
Werk en denkniveau onderzoek	WEDON	2.5	14181	4	Stays available for testing during 2021-2022
Computer science basics	CSB	7.5	75002	1	Stays available for testing during 2021-2022

In the transitional arrangements of these implementation regulations are the transitions for the named courses from 2020-2021. The old courses will no longer be available. Old courses that do need a resit can be tested by these courses.

Old					New
Coursename	**korte Naam**	**EC's**	**CU code CU……**	**Version**	**Transition**
HZ Personality 1	HZP1	2.5	20096	3	PPW1+ITP1
IT Personality 1	ITP1	2.5	22128	2	PIW+ITP2
HZ Personality 2	HZP2	2.5	20097	3	PPW2+ITP3
IT Personality 2	ITP2	2.5	22149	1	ITP4+ITP5
HZ Personality 3	HZP3	2.5	20098	2	ITP6+ITP7
IT Personality 3	ITP3	2.5	22152	1	ITP8+ITP9
Software Design	SDE	5	75020	1	SDE (75020V2)

2.3 Studyadvice

2.3.1 Enrollment in degree program after nbsa (Article 8.1, paragraph 9 CER HZ)

Students who receive a negative binding study advice can not register for the HZ program belonging to this CER again.

2.4 Experimentarticle

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

Chapter 3 Establishment and duration

3.1 Duration

The duration of the Implementation Regulations equals the duration of the Education and Examination Regulations HZ 2021-2021.

3.2 Establishment

These Implementation Regulations are established by the Executive Board on 13/07/2021.

Attachments

Chapter 2.2 Figure 1 translated in Dutch

Dimensie	Vertegenwoordigd
Activiteit • Analyseren • Adviseren • Ontwerpen • Realiseren • Beheren	Wat doet de ICT-er?
ICT-architectuur laag • Gebruikersinteractie • Bedrijfsprocessen • Software • Infrastructuur • Hardware interfacing • Data science	In welke context?
vaardigheidsniveau	Hoe complex is het?

Figure 4: Dimensies van de domein beschrijving van ICT.

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	