



ASSESSMENT REPORT

Limited Programme Assessment

**Professional bachelor programme
Information Technology**

Fulltime

Fontys Hogescholen

**De kracht van
kennis.**

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Limited Programme Assessment

**Professional bachelor programme
Information Technology**
Fulltime

Fontys Hogescholen
Fontys School of Technology and Logistics

Croho registration: 34479

Hobéon Certificering BV
7 March 2018

Audit Committee

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CONTENTS

1.	GENERAL AND QUANTITATIVE DATA	1
2.	SUMMARY	3
3.	INTRODUCTION	5
4.	FINDINGS AND JUDGEMENTS	7
4.1.	Intended learning outcomes	7
4.2.	Teaching and Learning Environment	10
4.3.	Assessment	15
4.4.	Achieved Learning Outcomes	18
5.	OVERALL CONCLUSION	21
6.	RECOMMENDATIONS	23
	ANNEXES	25
ANNEX I	Overview of judgements	27
ANNEX II	Programme of site-visit	29
ANNEX III	Documents reviewed	33
ANNEX IV	Composition of the audit panel	35

1. GENERAL AND QUANTITATIVE DATA

General data

Institution

Name	Fontys School of Technology and Logistics (FHTenL)
Status	Funded
Outcomes of Institutional Quality Assessment	Positive, June 2013

Programme

Name of programme in Central Register of Higher Professional Education (CROHO)	Bachelor Informatica/Bachelor Information Technology
ISAT-code CROHO	34479
Orientation and level	Professional bachelor
Number of credits	240
Variant	Fulltime
Eventual new name	N.A.
Specialisations	N.A.
Potential new specialisations	N.A.
Language of instruction	German and Dutch (Year 1 only), and English
Location	Venlo
Special Quality Feature	N.A.

<i>Date of site-visit</i>	21 November 2017
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2. SUMMARY

The study programme informatics is offered by FHT&L (Fontys Hogeschool voor Techniek en Logistiek) in Venlo. It is conducted entirely in English with the option to take the foundation semesters in either Dutch or German. The programme is one of sixteen in the Netherlands to offer a professional Bachelor in Informatics (also referred to as Information Technology).

Standard 1. Intended Learning Outcomes

The panel believes the intended learning outcomes of the course concur with standard quality. They have been carefully derived from the national profile, that was designed and reviewed using input from a substantial (inter)national body of professionals. It was linked to different reference frameworks to establish higher professional level and was subjected to input from the course's own Professional Advisory Board, whose members demonstrate profound commitment to the course.

A course-specific profile has been made explicit by adding two separate activities, being Professional Behaviour and Research Skills. The programme conveys a clear objective with regard to internationalisation, tying in well with the general features of an international programme, but this as yet has not been explicitly incorporated into the intended learning outcomes.

Considering the latter the panel rates Standard 1 as **'satisfactory'**.

Standard 2. Teaching and Learning Environment

The panel considers the content of curriculum up-to-date and its learning goals highly consistent with the intended learning outcomes. Its design facilitates both individual and group learning; concept-teaching and practice oriented education go hand-in-hand. Admission to the programme is sound and well-guided. The curriculum offers an interesting scope of activities in the field of internationalisation; also, the development of research abilities has firmly be integrated into the programme as part of the 'professional behaviour and research skills' learning path. A next step, of which the programme is well aware, would be to interlink the various elements of internationalisation and add coherence to them in an explicit learning track. Furthermore, the panel would like to see that all students are equally exposed to multidisciplinary activities.

The faculty is highly qualified and competent, also with regard to their didactical performance. All of the faculty have Masters level and forty percent of them hold a PhD. Their expertise in the various informatics domains as well as their knowledge about the professional field is up-to-date and is highly valued by the students. Professionalisation is given considerable and structural attention; the panel appreciates that nearly all lecturers followed a proficiency training to reinforce their English speaking skills.

Students express their high esteem for the quality of the physical learning environment, the study guidance and the provision of information. Recently the programme management has introduced a new method of scheduling, which should resolve issues with regard to the timely publication of the course roster.

Weighing the above the panel in particular considers decisive for its positive judgement on this standard: (i) the firmness and thoroughness of the programme design, clearly encouraging students to perform to the best of their abilities and (ii) the uncontested quality of the faculty.

The panel therefore assesses Standard 2 as **'good'**.

Standard 3. Learning Assessment System

The programme has implemented a solid assessment policy and system that at all times safeguards validity and reliability of tests and assessments. Students are well aware of the assessment criteria and the kind of performance they have to deliver. All lecturers are appointed examiners, which strengthens the faculty's continual and integral attention for the quality of assessments. Alignment and calibration between examiners is considered obvious. The Examination Board is well aware of its role and has currently discussed the position of the Assessment Committee with the management resulting in a clear confirmation of the division of responsibilities.

Particularly the degree of thoroughness and solidity of the programme's assessment system, specifically during the final stage of the programme, argues for the panel judgement '**good**' on Standard 3.

Standard 4. Learning outcomes achieved

On Standard 4 the course exceeds generic quality. Graduates of the programme overall demonstrate that they have firmly achieved the intended learning outcomes of the course. Across the board the panel is in accord with the marking of the graduation projects, the professional field expresses its total satisfaction about graduates' ability to take on different roles and to adapt to a wide range of professional contexts, which clearly reflects the course profile and its intended learning outcomes. Not only do professional field representatives consider the graduates of Fontys Informatics fit for the IT Business, they also perceive them as particularly motivated and result-driven compared to graduates from other universities, which qualifies Standard 4 for a '**good**'.

Overall conclusion:

The Bachelor of Informatics of FHT&L is guided by an adequate set of intended learning outcomes in which the internationalisation aspect still calls for more detail. It features a well-balanced curriculum, a solid and comprehensive assessment system and delivers graduates who demonstrate to have mastered the intended learning outcomes across the board and who are popular and highly rated employees in the IT Business. Field representatives characterise the graduates as strongly motivated, flexible and result-driven.

A recommendation for future development would be to make the internationalisation aspect an integral, but explicit, part of the intended learning outcomes.

In view of NVAO's assessment rules and the rating 'good' for the three standards 'teaching and learning environment', 'assessment system' and 'achievement of the learning outcomes', and a 'satisfactory' for Standard 1, the overall appreciation for the Bachelor of Informatics at FHT&L reads '**good**'.

7 March 2018


Drs. W.G. van Raaijen,
chair


H.R. van der Made,
secretary / coordinator

3. INTRODUCTION

The assessment of the professional bachelor programme Informatics of Fontys Venlo took place in the cluster 'B-Informatica'. Within this accreditation cluster programmes from Avans Hogeschool, Christelijke Hogeschool Windesheim, Hogeschool Inholland, Hogeschool Leiden, Hogeschool NCOI, Hogeschool Rotterdam, NHL Hogeschool and Stenden Hogeschool were visited and assessed within the same period.

Context and position of the programme

FHT&L (Fontys Hogeschool voor Techniek en Logistiek) in Venlo offers the study programme informatics to approximately 200 of its students. In total, FHT&L offers study programmes to around 1,400 students in several domains, ranging from informatics and Logistics to Mechatronics, Mechanical Engineering and Industrial Product Design. The school's mission is to respond to the demand of the Euregional labour market by offering attractive, high-quality study programmes in the domains of IT, Logistics and Engineering that support young people and help them to develop their potential into warranted competences. The school's vision is to offer a teaching and learning environment that fosters students' learning within the context of competences relevant for the praxis, and in a culture of challenging partnership and professionalism. Together with external stakeholders (authorities, entrepreneurs and education), and with an international focus, the campus Venlo, hence the course, strives to contribute to the innovative power of the Euregional industry.

The mission of the study programme informatics is to deliver graduates who are highly competent in the development of various types of software, show quality-driven and innovative professional behaviour, feel at ease in an international environment and are highly valued by regional and international employers. The programme thus features (software) engineering, the international context of the profession, student-centred learning, substantial professional practice and a personal approach.

The focus of the informatics programme lies naturally on software. In Eindhoven and Tilburg, Fontys offers the broader ICT course to about 4.000 mainly Dutch students who, unlike Fontys Venlo, choose their specialisation in semester 1 and not in semester 4. The HAN, as well as the Hogeschool Zuyd offer broad ICT study programmes, largely to Dutch students. The IT programmes in Nordrhein-Westphalia are offered in German and are shorter (3 or 3.5 years), more theoretical and less practice-oriented.

Quality assurance

In the wake of the previous accreditation audit the programme has taken the panel's recommendations to heart. It truly broadened the scope of its internationalisation activities and a number of updates have been executed to align the content of the programme with current developments in the professional field. Also, more attention is now being paid to students' research skills; to this end a dedicated module on applied research methods was introduced. Finally, the programme enhanced the quality of its communication with the students about the various aspects of content and execution of the curriculum.

In 2015 an internal audit was conducted that, again, led to a number of further improvements.

When relevant, the panel will address the results of the quality assurance cycle in the next section of the report.

4. FINDINGS AND JUDGEMENTS

This chapter deals with the panel members' findings and judgements based on the documents delivered by the course staff and the subsequent discussions during the site-visit. The text is ordered according to the four standards of the applicable NVAO assessment framework.

4.1. Intended learning outcomes

Standard 1: The intended learning outcomes of the programme have been concretised with regard to content, level and orientation; they meet international requirements.

Explanation: As for level (Bachelors or Masters) and orientation (professional or academic), the intended learning outcomes fit into the Dutch qualifications framework. In addition, they tie in with the international perspective of the requirements currently set by the professional field and the discipline with regard to the contents of the programme. Insofar as is applicable, the intended learning outcomes are in accordance with relevant legislation and regulations.

Findings

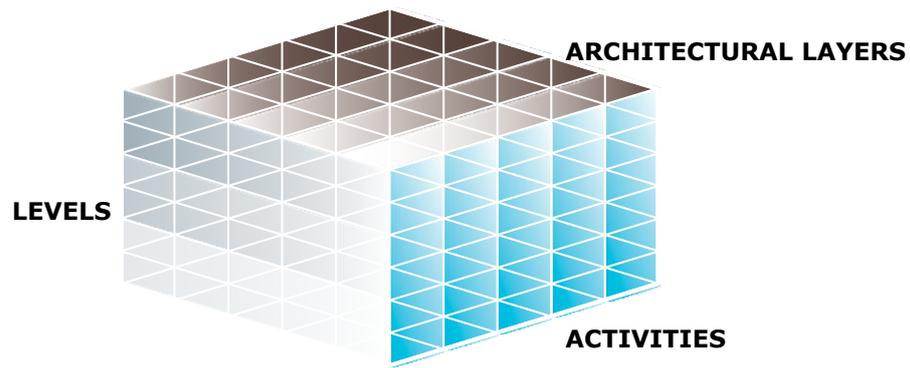
The panel has seen a well thought out set of intended learning outcomes, directly derived from the national HBO-i profile. This profile takes the shape of a cube, thus representing the three dimensions of the profile in terms of 'activities' (competences), architectural layers (context) and 'level of command' (complexity). The national profile is of an abstract nature, leaving ample room for individual Bachelor courses to choose their own profile and position within the domain.

The first dimension consists of five *lifecycle activities* – 'manage', 'analyse', 'advise', 'design' and 'implement', derived from the lifecycle of information systems. Each Bachelor of ICT should be able to execute these activities within the context of their profession. Quality aspects such as security, budget and available time, are very important for each of the five lifecycle activities. The programme at Fontys extended the activities dimension with two architecture-independent aspects, namely 'professional behaviour' and 'research skills', thus explicitly featuring their value for the graduates they deliver.

The second dimension consists of five architectural layers: 'user interaction', 'business processes', 'infrastructure', 'software' and 'hardware interfacing'.

The third dimension regards the level of skill, leaving room for individual programmes to determine student's final performance level of each of the activities.

Level Of Autonomy	Behaviour	Context	
1	Able to apply knowledge and skills to elementary problems.	Bear responsibility for one's own actions.	Stable.
2	Behave independently during identified activities.	Manage others within set boundaries. Has a capacity for conceptual thinking and modelling, using creative thinking.	Predictable and at times unpredictable.
3	Able to use innovative methods and to show initiative.	Innovative, leadership, responsibility for teams.	Unpredictable environment.



In the design and subsequent review process of the HBO-i profile in 2014 all required steps were taken to define them at the required level (Dublin descriptors, level 6 NLQF, alignment with dimension 3 of the European E-competence Framework) and furnish them with the appropriate professional orientation, detailed into a clear Knowledge Base. To that end a broad consultation of the (inter)national professional field was conducted, enhanced by a regular and systematic overhaul of the intended learning outcomes by the School's own Professional Advisory Board. It arose from the audit discussions that the PAB members deliver meaningful input and are highly committed to the programme. Also they are well connected to both the informatics domain and the region in which Fontys Informatics is positioned.

Based on the national cubic model and the programme's own extensions, the following profile of the course was defined:

Activities \ Arch. layers	Manage	Analyse	Advise	Design	Implement	Professional Behaviour	Research Skills
	Skills level:						
User interaction							
Business processes							
Infrastructure	2 or 3	2 or 3	2 or 3	2 or 3	2 or 3	3	3
Software							
Hardware interfacing							

Besides 'Professional Behaviour' and 'Research Skills' students are expected to finalise at least three activities at level three on any architectural layer.

The course states that the rationale behind their choices within the course profile is that by experience the average project of an informatics professional at the higher vocational level requires a performance that reflects skills level 3 in at least three activities, commonly 'analysis', 'design' and 'implementation', executed within varying architectural layers. Since a software engineer has to perform all activities, the other two must at least be obtained at skills level 2. The panel endorses the given explanation. Experience, supported by data, shows that most students graduate in the architectural layers Business Processes, Infrastructure and Software.

In its so called roadmap for 2018-2022 the programme outlines its vision on internationalisation. The programme's objectives in this field are to get their student *'to act in an international environment by offering education and literature in English, but even more by letting students from different countries and nationalities work together in multicultural settings and by enabling and motivating students to partly study abroad.'*

The panel strongly supports this objective but would recommend – particularly in the case of an international course – to more strongly incorporate it into the course profile, either by expanding ‘professional behaviour’ in this sense or by adding it as another separate activity.

Considerations and Judgement

The panel believes the intended learning outcomes of the course concur with standard quality. They have been carefully derived from the national profile, that was designed and reviewed using input from a substantial (inter)national body of professionals. It was linked to different reference frameworks to establish higher professional level and was subjected to input from the course’s own Professional Advisory Board, whose members demonstrate profound commitment to the course.

A course-specific profile has been made explicit by adding two separate activities, being Professional Behaviour and Research Skills. The programme conveys a clear objective with regard to internationalisation, tying in well with the general features of an international programme, but this as yet has not been explicitly incorporated into the intended learning outcomes.

Considering the latter the panel rates Standard 1 as **‘satisfactory’**.

4.2. Teaching and Learning Environment

Standard 2: The curriculum, staff and programme-specific services and facilities enable the incoming students to achieve the intended learning outcomes.

Explanation: The contents and structure of the curriculum enable the students admitted to achieve the intended learning outcomes. The quality of the staff and of the programme-specific services and facilities is essential to that end. Curriculum, staff, services and facilities constitute a coherent teaching-learning environment for the students.

Findings

Programme

In its Self-Evaluation the programme presented to the panel the line-up of the programme. The following diagram clearly outlines the programme:

Code	Module	ECTS	Code	Module	ECTS
Semester 1					
JAVA1	Programming in Java 1	5	ENG	English 1	2
DBS1	Databases	5	MAT1	Mathematics 1	4
BUA	Business Administration	4	PRJ1	Project 1: Web Application	10
Semester 2					
JAVA2	Programming in Java 2	5	BUMA	Business Management (PM)	3
MOD1	Modelling Techniques 1	4	ITSM	IT Service Management	5
SEN1	SW Engineering & Testing	3	PRJ2	Proj. 2: Business Application	10
Semester 3					
MOD2	Modelling Techniques 2	5	STA1	Statistics	4
CON1	Consultancy 1	4	ALDA	Algorithms & Data Structures	4
RENG	Requirements Engineering	4	APPL	Applied Research Methods	3
CSA1	Computer System Architecture	3	PRJ3	Project 3: Lift Control	3
Semester 4					
Package Advanced Software Concepts			Package Business Informatics		
JAVA3	Java Concurrency	5	DAWA	Data Warehouses	3
DNET	Programming in C# and .Net	5	BINT	Business Intelligence	5
XMLJ	XML and Java	4	ACCO	Accounting	5
CSA2	Networks and Security	3	ERP	Enterprise Resource Planning	5
CSA3	Operating Systems	5	AOPR	Advanced Office Automation	3
MAT2	Maths 2 (Graphs & Numerical Analysis)	4	BPM	Business Process Management	5
APPS	App Development	4	APPS	App Development	4
Semester 5					
STG1	Internship				30
Semester 6					
MIN	Minor (Innovation & Research, FHTenL Minor, Fontys Minor, Minor Abroad, ..)				30
Semester 7					
SOFA	Software Factory	15	Choice of two modules from:		5
PRS1	Professional Skills: - Communication Psychology - Ethics and Law in IT	5	- ESD: Enterprise SW Development		5
			- IOT: Programming IoT		
			- AVR: Augmented and Virtual Reality		
			- DAMI: Machine Learning - SAP: SAP in Logistics		
Semester 8					
STG2	Graduation Project				30

The curriculum takes shape in 8 semesters of 30EC each. The first three semesters are of a founding nature and are thus taken by all students. In semester 4, students opt one of two semester packages. They either choose to discover further concepts and types of software (package advanced software concepts, (asc)) or decide for a deeper understanding of how software can be used in various business contexts (package business informatics, (bi)).

Internships are taken in semester 5 and a minor is scheduled in semester 6. Both semesters offer ample opportunities for students to strengthen their individual profiles. Semester 7 features the Software Factory, which is a large project commissioned by a real customer; in addition a number of electives are offered. The final semester 8 has the graduation project through which students have

to demonstrate the attainment of the final learning outcomes of the study program.

The panel observes a nice balance between shared and individual elements, and between theory and practice alike. All semesters incorporate a project. These projects lend cohesion to the curriculum and are scaled from small and well-structured in semester 1 to authentically unstructured and unpredictable in semester 7. Most educational units, and not only projects, demand from students practical application, so as to provide true understanding of major concepts. During the audit the panel reviewed a sample of project reports. It considered them, without exception, interesting, topical and relevant to students' development. Projects throughout the programme also demand collaborative skills. Supported by project coaches and by learning how to work effectively in groups, students develop the social skills required for IT professionals. Although teamwork is trained and developed, project results are always assessed individually to avoid free-riding.

Rightly the programme does not focus on any specific software such as Linux, OSX or Windows. Instead, students are taught how to consider alternatives and make reasonable choices between different technologies and approaches. Hence, the programme provides a solid foundation in the first four semesters. These semesters are rarely changed fundamentally, whereas semester 7 is flexible by design allowing for new electives to be scheduled if trends and topicality so require. A review of the literature used made the panel conclude that the selected study books are up-to-date and tie in well with the aimed professional level.

The panel considers the curriculum well-thought out, featuring a nice balance between conceptual thinking and practical application, as was illustrated by reviewed projects and internship reports on display during the site-visit. The programme scheme and the learning goals of the units of study clearly demand from the students an increasing degree of complexity and self-reliance. Similarly, the scope of assignments becomes explicitly more complex as the programme continues.

Also, the programme manages to strike a deliberate balance between shared elements and individual profiling. A point for attention the panel would like to make is the fact that students themselves determine to some degree whether they (prefer to) work in multidisciplinary project teams, largely depending on the choice for their electives, thus enabling them to miss out on this invaluable experience. The panel was happy to learn that the programme aims at expanding the number of multi-disciplinary projects in conjunction with neighbouring programmes within FHT&L. The panel would recommend to explore options to equally expose *all students* to multidisciplinary activities.

A review by the panel of the so called CLUS¹ scheme – a programme alignment tool adopted throughout Fontys – provided understanding as to how the learning goals of the study units have been linked to cover the intended learning outcomes and how these learning goals are assessed. The panel appreciates the recently 'home-made' digitalized version of the CLUS which brought to light some minor inconsistencies, and believes the scheme also provides insight to students into the curriculum consistency. The panel commends the faculty for the neat and coherent design of its curriculum.

The panel appraises the management's attempt to get a dedicated professorship on Smart Industries appointed at FHT&L, a joint effort with the Fontys branch at Eindhoven. The panel agrees that this would almost certainly give a boost to tri-partite innovative research projects in which the school, professorship and professional field participate for the benefit of all parties, particularly students and lecturers. All the same, the panel noticed that research as such does not 'play second fiddle'. With the course being firmly involved in the so-called LogWear research project (see further on), and almost all lecturers somehow having a background in research with nearly 50% of them holding a PhD, students' exploratory posture is definitely energized. Not only do students testify on this in the audit, their (final) projects, too, exemplify it.

¹ CLUS, meaning: Competencies, Learning Goals, Units of study and Study Points.

Although a number of aspects, such as the internationally accepted content of the curriculum, the full-integration of Dutch and German intake into an English first year stream, English teaching from year 2 onwards, multi-cultural project groups, options to do international internships or a minor abroad, all bear an international focus, at the time of the audit a well-structured internationalisation scheme or track is not yet in place. The panel was pleased to learn that the programme intends to incorporate this aspect more clearly into its Professionalisation track and link it to communication skills. The panel strongly supports this idea.

Like the students with whom the panel conversed, the auditors express their enthusiasm about the way the programme is executed: teaching formats vary and are well attuned with the social-constructivist concept of the curriculum that clearly aims at encouraging students to work together and develop social and professional skills in real-life or simulated contexts.

With regard to the safeguarding of the enrolment procedure, the panel concludes that the course has its finger on the pulse and puts serious effort into bridging differences in prior learning; among others it forms first year project groups on the basis of students' prior knowledge to which end a survey is conducted to identify possible discrepancies. For Maths and English entrance tests are administered to determine whether students should either follow or may skip these modules. Also, in consent with the Examination Board the programme offers the possibility of individual study plans for students who already followed prior informatics courses at university level.

In view of the safeguarding of continual and direct student feedback, the panel would strongly recommend to press ahead with the recreation of the legally required Study Programme Committee and to bring it expressly under the attention of all students, as no student appeared aware of the existence of such a Participation Body.

Overall, the panel praises the quality of the programme. A judgement shared by the students who generally reward it with high scores in the National Student Enquiry (NSE, average score of 3.86 on a five-point scale).

Staff

The faculty is relatively small in terms of full-time equivalents. Only 8.45fte are filled by 10 core-team lecturers, supported by three external lecturers on 0.6fte. The staff-capacity matches the student body as staff to student ratio equals 1 : 22. Students on the student panel express their satisfaction about staff availability and approachability as they testify that lecturers remain available for questions, additional explanation and help after classes. Their commitment is supported by the outcomes of the NSE (4.1).

With all of the faculty being Master-educated and nearly half of them holding a PhD in relevant domains to the study, the staff is unquestionably qualified to execute the programme. Not only are they qualified, but knowledgeable and skilled as well. From the audit discussions a team of lecturers emerged that not only possesses international, as well as intercultural and interdisciplinary expertise, but also subject specific knowledge and skills. Their didactics competencies too are generally highly valued, as some students refer to particular faculty members who they consider role models in terms of their didactical approach and their ability to explain complex matters.

Professionalisation is considered an embedded and continual activity at Fontys; this also holds good for the Informatics programme. Three percent of the yearly budget is spent on both team and individual professionalisation activities. In this area a colloquium is held every week and new staff members should acquire their BKO qualification within their first year of appointment.

Also lecturers are funded to participate in LogWear, which is a multi-disciplinary research project on the possibilities and challenges of wearables in Logistics. Lately lecturers' proficiency in English is addressed more firmly through training, to have them all meet the C1 level. This issue appears to be a reoccurring item in the staff performance interviews. The panel is positive about the actions taken so far and would urge the management to press ahead with this key quality feature of an international programme.

Programme-specific services and facilities

The site visit programme comprised a tour of the FHT&L premises. The panel assesses the physical learning environment as highly facilitating for students to obtain the projected learning outcomes of the course. Rooms are well-equipped and the digital learning environment has all required study information and interactive study modes, allowing for remote group work to take place. A digital library service offers rental or digital equipment such as laptops, beamers and cameras. Student express their firm satisfaction with the quality of the physical learning environment, not only during the site visit but also in the NSE (average score of 3.65). Only issue that needs minding is the timely issuing of timetables, which prior to the audit had already been addressed by introducing block-schedules, the positive effect of which still had to be evaluated.

All students receive study career coaching. Not only does it introduce students at the outset to the ins and outs of the study program, it also guides them through their study. To this end in their first year one contact-hour weekly is scheduled on study counselling. Every student is allocated a study-mentor who is also lecturer, to discuss his well-being and progress four times in year 1 and twice in year 2. Further on in his study the initiative for study guidance is up to the student. The entire mentoring program is coordinated and being surveyed by one of the lecturers. Students, both in the audit and the NSE, express their satisfaction about the study guidance they receive.

Considerations and Judgement

The panel considers the content of curriculum up-to-date and its learning goals highly consistent with the intended learning outcomes. Its design facilitates both individual and group learning; concept-teaching and practice oriented education go hand-in-hand. Admission to the programme is sound and well-guided. The curriculum offers an interesting scope of activities in the field of internationalisation; also, the development of research abilities has firmly be integrated into the programme as part of the 'professional behaviour and research skills' learning path. A next step, of which the programme is well aware, would be to interlink the various elements of internationalisation and add coherence to them in an explicit learning track. Furthermore, the panel would like to see that all students are equally exposed to multidisciplinary activities.

The faculty is highly qualified and competent, also with regard to their didactical performance. All of the faculty have Masters level and forty percent of them hold a PhD. Their expertise in the various informatics domains as well as their knowledge about the professional field is up-to-date and is highly valued by the students. Professionalisation is given considerable and structural attention; the panel appreciates that nearly all lecturers followed a proficiency training to reinforce their English speaking skills.

Students express their high esteem for the quality of the physical learning environment, the study guidance and the provision of information. Recently the programme management has introduced a new method of scheduling, which should resolve issues with regard to the timely publication of the course roster.

Weighing the above the panel in particular considers decisive for its positive judgement on this standard: (i) the firmness and thoroughness of the programme design, clearly encouraging students to perform to the best of their abilities and (ii) the uncontested quality of the faculty.

The panel therefore assesses Standard 2 as **'good'**.

4.3. Assessment

Standard 3: The programme has an adequate assessment system in place.

Explanation: The tests and assessments are valid, reliable and transparent to the students. The programme's examining board safeguards the quality of the interim and final tests administered.

Findings

Assessment system

At faculty level an Assessment Policy for all programmes within the faculty has been drawn up. This document states guidelines for the design and implementation of assessments. Guiding principles are that (i) each study program should use an adequate set of assessment formats through which it can assess whether a student has achieved the learning goals of that particular study program and (ii) assessments and grading should form an integral part of the study program and should match the learning goals in format and content, as well as the legal, organisational and financial constraints.

The programme has a broad scope of test formats in place, all of which are geared to the evaluation of (the application of) knowledge, skills or the integration thereof. Examples are: oral assessments, written exams, reports, oral presentations, performance assessments, peer assessments, process and product assessments.

The programme designed an Assessment Plan indicating which test modes are deployed for which learning goals. Linking the CLUS scheme to the Assessment Plan provides understanding of how learning goals are assessed and whether all of them are assessed. A review of this Assessment Plan in connection with the learning goals and the corresponding tests or assessments enabled the panel to establish that the deployed test formats tie in well with the (nature of the) respective learning goals. A subsequent closer view at a broad sample of tests on display during the site visit shun light on the actual quality of already held exams and the marking thereof. The panel judged positive on both the test quality and the content level of the interim exams. Furthermore, formative feedback was given frequently and purposefully and, as students said, additionally elaborated on orally.

Organisation wise each educational unit has one responsible coordinating examiner and at least one additional examiner, the so called buddy, serving as a sparring partner and preferably teaching a parallel class. Together they are responsible for setting up the unit in tune with the set learning goals; they select working formats and construct, execute and evaluate assessments.

The buddy system sees to it that the four-eye principle is applied to all tests, thus safeguarding a great deal of inter-examiner reliability. With due respect for the relatively small scale of the programme the panel would like to warn for the obvious blind spots of permanent buddies and would recommend – as is now carried out on an irregular basis – to regularly alternate buddies or have a larger team of examiners review interim exams.

To achieve test validity all assessment criteria, questions and its answer model are carefully checked against the learning goals of the study unit to be assessed. The programme presented a number of examples of such test matrices or blueprints that, in the opinion of the panel, clearly add to securing test-validity. Another aspect of test-validity is assured by the fact that the programme has chosen to always put students to the test individually, also in the case of group work. The panel commends the programme for this approach.

Students have access to the Study Guide that provides descriptions of all study units. Each educational unit comes with a short description of its learning goals, working format(s) and assessment mode(s), thus providing students prior insight into the assessment conditions and the criteria they are expected to meet.

After the grades were published, students are invited to a post-exam review or, for other assessment formats, to receive feedback. Also, students get formative feedback on their interim results orally during projects, internships and graduation projects, and on their solutions to assignments during practical training, which the students said to appreciate.

Graduation

Students demonstrate their command of the intended learning outcomes by delivering a graduation project which comprises the following dimensions:

Dimension	Points	Criteria for this Dimension
Product	max 30	three activities on respective architectural layers on skills level 3
Professional Behavior	max 30	problem orientation/effectiveness and creativity, project and quality management, communication with the environment, criteria-based decision making, productivity, complexity of the environment
Research Skills	max 20	investigative attitude, ability to use state-of-the-art techniques, use of relevant knowledge and sources, sound research
Report Skills	max 10	citation and references, formal aspects and language, structure, completeness, overall convincing
Presentation Skills	max 10	verbal and nonverbal communication, slides, structure, defense, overall convincing
Reflection	must be sufficient	written in terms of study profile / qualifications, critical towards own performance (process and results), pointing out possibilities for improvement
In total	100	Final grade = student's total / 10

The panel reviewed the assessment forms of several graduation projects and established that through the project criteria all of the intended learning outcomes are assessed. Also the assessment forms for both the product and the other dimensions have been detailed into rubrics, so as to foster well-considered and aligned judgments. The panel appreciates the fact that the programme is currently working on the enhancement of the assessment forms for interim exams and interim assessments by also introducing the rubrics concept.

All permanent staff are appointed examiners for the graduation project. All oral assessments are conducted by two examiners, written tests and performance assessments are checked by at least two examiners and all assessment results are analysed together and, if need be, lead to future amendments. The panel believes the course has a firm assessment system in place that lends validity and reliability to the assessments, and provides transparency to students.

Examination Board

In the audit the panel spoke with members of the Examination Board, which operates at faculty level. The discussion gave the panel confidence that its members are qualified for their position in the quality assurance system. They fulfil their independent role and are in full control of the assessment quality.

It appeared that the Examination Board had a dispute with the management of the institution on the position of the Assessment Committee, that was in the process of being discharged as per 1 January 2018. Recently, tasks and responsibilities have been mutually reconfirmed between the management and the Examination Board, meaning that the management is responsible for the preparation and determination of the general test and assessment policy and its operationalisation, monitoring and execution thereof within the programme teams. The Examination Board, on the other hand, is responsible for the safeguarding of the quality of assessments.

To enable proper execution of these tasks it was agreed upon that the management will furnish the Board with additional resources, possibly by allowing the instalment of a dedicated assessment review committee falling under the jurisdiction of the Examination Board. The panel strongly agrees with this set up, but could of course as yet not establish the proper working of it. It is, however, confident that the intervention will lead to the expected quality requirements, not in the least because of the faculty's overall focus on quality assurance.

Considerations and Judgement

The programme has implemented a solid assessment policy and system that at all times safeguards validity and reliability of tests and assessments. Students are well aware of the assessment criteria and the kind of performance they are required to deliver. All lecturers are appointed examiners, which strengthens the faculty's continual and integral attention for the quality of assessments. Alignment and calibration between examiners is considered obvious. The Examination Board is well aware of its role and has currently discussed the position of the Assessment Committee with the management resulting in a clear confirmation of the division of responsibilities.

Particularly the degree of thoroughness and solidity of the programme's assessment system, specifically during the final stage of the programme, argues for the panel judgement '**good**' on Standard 3.

4.4. Achieved Learning Outcomes

Standard 4: The programme demonstrates that the intended learning outcomes are achieved.

Explanation: The level achieved is demonstrated by interim and final tests, final projects and the performance of graduates in actual practice or in post-graduate programmes.

Findings

The audit included a sample review of students' graduation work. Prior to the audit the panel made a random and stratified selection of 15 graduation projects, all of which were considered distinctly up to the mark and the panel's judgement fell well within the range of grades awarded by the examiners. The subjects dealt with were relevant, the company-contexts in which students did their research were challenging and the degree of depth and complexity of the projects in tune with what should commonly be expected at higher professional level. Also, the research methodologies deployed, mostly focussing on design, were generally well-considered and applicable. The average grade of graduates in the past two years was 7.7.

Performance of graduates

Graduates of the course in general qualify for relevant and interesting posts in the IT Business. Alumni who participated in the audit were either IT consultant, software consultant or software engineer at renowned firms. From a survey held among alumni it shows that 53% work for international companies, 48% use English as the lingua franca.

Alumni appreciate the fact that the study is broad, which enables graduates to adapt easily to any concept or programming language.

The alumni in the audit illustrated how their graduation projects had led to implementation in their graduation companies and, as representatives from the professional field confirmed, the alumni with whom they have worked usually come up with solid solutions.

Another feature of the graduates is that they are able to switch roles easily, e.g. from software engineering to business, because the different roles were practiced during the projects in the programme. This, they say, gives you an advantage over graduates from other universities, for instance because you have learned how to communicate with engineers or discuss IT concepts with both mediator and senior consultants.

Two of the graduates with whom the panel spoke currently follow Master programmes in Computer Science. Both say that they feel well-equipped to take an academic study. The programme stays in touch with its alumni through the alumni union; members are called upon in case an internship is required and some of them are asked to conduct guest lectures.

The work field representatives in the audit characterise graduates from Venlo as more result-driven compared to students from other universities of applied sciences or, for that matter, even from the Fontys location in Eindhoven.

Considerations and Judgement

On Standard 4 the course exceeds generic quality. Graduates of the programme overall demonstrate that they have firmly achieved the intended learning outcomes of the course.

Across the board the panel is in accord with the marking of the graduation projects, the professional field expresses its total satisfaction about graduates' ability to take on different roles and to adapt to a wide range of professional contexts, which clearly reflects the course profile and its intended learning outcomes. Not only do professional field representatives consider the graduates of Fontys Informatics fit for the IT Business, they also perceive them as particularly motivated and result-driven compared to graduates from other universities, which qualifies Standard 4 for a **'good'**.

5. OVERALL CONCLUSION

The Bachelor of Informatics of FHT&L is guided by an adequate set of intended learning outcomes in which the internationalisation aspect still calls for more detail. It features a well-balanced curriculum, a highly qualified and competent faculty, a solid and comprehensive assessment system and delivers graduates who demonstrate to have mastered the intended learning outcomes across the board and who are popular and highly rated employees in the IT Business. Field representatives characterise the graduates as strongly motivated, flexible and result-driven.

A recommendation for future development would be to make the internationalisation aspect an integral, but explicit, part of the intended learning outcomes.

In view of NVAO's assessment rules and the rating 'good' for the three standards 'teaching and learning environment', 'assessment system' and 'achievement of the learning outcomes', and a 'satisfactory' for Standard 1, the overall appreciation for the Bachelor of Informatics at FHT&L reads **'good'**.

6. RECOMMENDATIONS

- Give more detail to the internationalisation aspect as integral part of the intended learning outcomes.
- Make the individual internationalisation components within the programme more visible and explicit, attune them and subsequently include them into a clear internationalisation-line.
- Explore options to equally expose all students to multidisciplinary activities.

ANNEXES

ANNEX I Overview of judgements

Overview of judgements on the HBO Bachelor programme Informatics (fulltime) of the Fontys School of Technology and Logistics	
Standard	Judgements
Standard 1. Intended Learning Outcomes	S
Standard 2. Teaching and Learning Environment	G
Standard 3. Assessment	G
Standard 4. Learning Outcomes Achieved	G
Overall judgement	G

ANNEX II Programme of site-visit

Date: 21 November 2017

Location: Fontys School of Technology and Logistics, Tegelseweg 255, 5912 BG Venlo

Time	Auditees	Topics
08.00 – 08.15	Reception of audit panel	
08.15 – 08.25	Introduction study program manager <ul style="list-style-type: none"> Hans Aarts MSc - Director FHTenL Richard van den Ham MA - Study Program Manager 	
08.25 – 08.35	Management	establishing agenda
08.35 – 09.35	Preparatory meeting panel members	
09.35 – 10.20	Meeting alumni and representatives IT business: <ul style="list-style-type: none"> Hans Schuren MSc - Director at TMC Test & Integration – Member Council of Experts and Advisory Board Manuel Gerding MSc - IT Consultant at Codecentric AG - Alumnus Advanced Software Concepts profile and member Advisory Board Ben Stassen BSc - Consultant at Pulse Business Solutions BV - Alumnus Business Informatics profile Wesley Notten BSc – Software Consultant at CGI – Alumnus Advanced Software Concepts profile Max Stoll BSc - Software Engineer at Quantoz Technology - Alumnus Software Concepts profile 	<ul style="list-style-type: none"> mission & strategy developments in professional field market position / competitive position education performance /output/ success rate interaction with professional field / customer relationship management international focus
10.20 – 10.30	Break/panel retrospective	
10.30 – 11.30	Student project presentations and tour <ul style="list-style-type: none"> Semester 1 - Project Web Development Semester 3 - Module Applied Research Semester 3 - Project Elevator Simulation Semester 5 - Internship LogWear Research Semester 6 - Minor Smart Innovation Semester 7 - Software Factory Hololens in SMART Logistics Tour - Informatics department 	<ul style="list-style-type: none"> with visit Web Development Project (semester 1) class and Consultancy (semester 3) class

Time	Auditees	Topics
11.30 – 12.20	Students <ul style="list-style-type: none"> • Bas Tomlow, 1st year Dutch class • Tobias Jansen, 1st year German class • Diana Rusu, 1st year international class • Dave Hoevenaars, 2nd year - Member Participation Council (IMR) • Moritz Iseke, 2nd year • Brian Herman, 2nd year • Lea Rosenberg, 3rd year (internship) • Courtney Regan, 3rd year (internship) • Mike Schatorjé, 4th year • Jurian Janssen, 4th year 	<ul style="list-style-type: none"> ▪ quality of teachers ▪ information and communication facilities ▪ learning assessment / feedback tutoring (incl. practical periods) ▪ feasibility and workload ▪ educational facilities ▪ final projects/exams ▪ student participation in the school's decision making
12.20 – 13.05	Lunch / Panel retrospective	
13.05 – 13.55	Faculty <ul style="list-style-type: none"> • Sander Bruinsma MSc • Thijs Dorssers MSc - Internship and Graduation Project Coordinator • Christiane Holz MSc - Chairman Examination Board • Pieter van den Hombergh MSc - Colloquium Coordinator • Dr. Geert Monsieur - Member Study Program Committee, Research LogWear • Dr. Ferd van Odenhoven • Dr. Gregor Schwake - Member Participation Council (IMR), Research LogWear • Stefan Sobek MSc, Research LogWear 	<ul style="list-style-type: none"> ▪ curriculum development ▪ involvement professional field ▪ intrinsic backbone of the programme's contents ▪ distinctive features of the programme ▪ practical components ▪ learning assessment (methods, standards, parties involved, scoring & feedback) ▪ tutoring ▪ (applied) research & development ▪ education performance / success rate ▪ interaction with the management
13.55 – 14.05	Break/panel retrospective	
14.05 – 14.55	Examination and Assessment Board <ul style="list-style-type: none"> ▪ Christiane Holz MSc – Chairman ▪ Herman Sturmans MSc 	<ul style="list-style-type: none"> ▪ quality assurance learning assessment ▪ achievement of intended learning outcomes ▪ authority of the examination board ▪ relation to the management ▪ assessment: involvement of the professional field ▪ assessment expertise
14.55 – 15.05	Break/Panel retrospective	
15.05 – 15.35	Meeting management team: <ul style="list-style-type: none"> • Hans Aarts MSc - Director • Richard van den Ham MA - Study Program Manager • Aukje Schurer MSc - Quality Officer FHTenL 	<ul style="list-style-type: none"> ▪ pending issues ▪ mission & strategy ▪ developments in professional field ▪ market position / competitive position ▪ input-throughput-output / success rate ▪ interaction with professional field / curriculum development ▪ international focus ▪ (applied) research & development ▪ personnel management / staff policy
15.35 – 16.35	Break/Panel retrospective	Preparation of preliminary judgements and feedback
16.35 – 16.55	Feedback session	

Time	Auditees	Topics
16.55 – 17.10	Break	
17.10 – 18.00	Development session	

Audit approach

Selection of the delegations / the auditees

In compliance with the NVAO regulations the audit panel prior to the audit decided on the composition of the delegations (auditees) in consultation with the course management and on the basis of the points of focus that had arisen from the panel's analysis of the course documents.

Auditing process

The following procedure was adopted. The panel studied the documents regarding the programme (Annex III: Documents reviewed) and a number of theses. The panel secretary organised input from the auditors and distributed the preliminary findings among the panel members prior to the audit. A preparatory meeting of the panel was part of the site visit (Annex II: Programme of the site visit).

The panel formulated its preliminary assessments per standard immediately after the site visit. These were based on the findings of the site visit, and building on the assessment of the programme documents.

A first version of the assessment report was drafted by the secretary and circulated among the members of the panel for review and comments. The final draft was subsequently forwarded to the institute to correct factual inaccuracies. The panel finalised the report on 5 March 2018.

Assessment rules

The assessment panel evaluates the programme against the standards of the applying assessment framework using the following assessment scale: unsatisfactory - satisfactory - good - excellent.

For a positive final conclusion regarding the programme as a whole, each theme must at least be rated satisfactory.

The final outcome of the programme assessment will always read 'unsatisfactory' if standards 1, 3 or 4 are considered 'unsatisfactory'. In case of an unsatisfactory score on standard 1, no improvement period will be assigned causing the programme to close down.

The final conclusion regarding the programme as a whole can only read 'good' if at least two standards are assessed as 'good', one of which must be standard 4.

The final conclusion regarding the programme as a whole can only read 'excellent' if at least two standards are judged 'excellent', one of which must be standard 4.

The overall conclusion on the programme will always read 'unsatisfactory' if standards 1 and/or 3 are rated 'unsatisfactory'. In case of an unsatisfactory score on standards 1 or 3, NVAO cannot grant the programme conditional initial accreditation.

ANNEX III Documents reviewed

- Self-evaluation
- Domain Description Bachelor of ICT
- Roadmaps (action plans on several topics)
- Survey of faculty
- Minutes Professional Advisory Board
- Minutes Examination Board
- Annual Report Examination Board, 2016/2017
- Reflections from external examiners
- EER 2016-2017 and 2017-2018
- Assessment policies
- CLUS scheme and Roadmap Assessment System
- Assessment forms and rubrics
- Reference books and other study materials
- Curriculum and course descriptions
- A selection of interim-tests, assessments and project reports
- An overview of final projects, selected by the panel, of the past two years with corresponding assessment criteria and requirements;
- List of 15 final projects/papers examined prior to the audit²:

2199905
2198664
2190371
2188058
2193671
2214660
2221875
2203896
2316277
2163280
2208434
2213640
2208722
2366177
2210293

² Following NVAO regulations student enrolment numbers have been denoted here. For reasons of privacy names of students and projects are known to the panel members and panel secretary only.

ANNEX IV Composition of the audit panel

Panel members	Expertise					
	auditing and quality assurance	education and assessment	professional field	discipline	International	student-related
Drs. W.R. (Willem) van Raaijen	X	X				
K. (Kevin) van Ingen, Msc		X	X	X	X	
Ir. C.J. (Cees) Rijsenbrij	X	X	X	X	X	
S.D. (Daniël) Moerman						X

co-ordinator/certified secretary: H.R. (Rob) van der Made

Succinct CVs of panel members and secretary/co-ordinator

1	Willem van Raaijen is partner at Hobéon and lead-auditor since 2004
2	Kevin van Ingen, MSc is consultant/software development at Codecentric Netherlands
3	Cees Rijsenbrij is programme manager HBO-ICT at the UoAS Amsterdam
4	Daniël Moerman is student Informatics at UOaS Leiden

On 26 June 2017 the NVAO endorsed the composition of the panel to assess the Bachelor Informatics of the University of Applied Sciences Fontys, registration 005596.

Prior to the audit all panel members undersigned declarations of independence and confidentiality which were filed at the NVAO. This declaration certifies, among other things, that an auditor does not currently maintain or has not maintained for at least the last five years with the institution concerned any connections or ties neither of a personal nature nor as a researcher/lecturer, professional or consultant, that may inhibit him or her from expressing an unbiased and fully independent judgement on the quality of the programme.



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