STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

MASTER IN INTERNATIONAL CYBERSECURITY AND CYBERINTELLIGENCE

offered by University of Granada, University of Minho, University of Padova, and Vilnius University

EXTERNAL EVALUATION REPORT

Review coordinated by SKVC

Following the European Approach on Quality Assurance for Joint Programmes

Report prepared in 2024

Report language: English

CONTENTS

I. GENERAL INFORMATION **3**

1.1. OUTLINE OF THE EVALUATION PROCESS 3

1.2. REVIEW PANEL 4

1.3. SITE VISIT 4

1.4. BACKGROUND OF THE REVIEW 4

II. OVERALL ASSESSMENT **7**

III. ASSESSMENT STANDARDS **8**

STANDARD 1. ELIGIBILITY 8

STANDARD 2. LEARNING OUTCOMES 11

STANDARD 3. STUDY PROGRAMME [ESG 1.2] 15

STANDARD 4. ADMISSION AND RECOGNITION [ESG 1.4] 22

STANDARD 5. LEARNING, TEACHING AND ASSESSMENT [ESG 1.3] 26

STANDARD 6. STUDENT SUPPORT [ESG 1.6] 29

STANDARD 7. RESOURCES [ESG 1.5 & 1.6] 32

STANDARD 8. TRANSPARENCY AND DOCUMENTATION [ESG 1.8] 35

STANDARD 9. QUALITY ASSURANCE [ESG 1.1 & PART 1] 37

IV. SUMMARY **39**

I. GENERAL INFORMATION

1.1. OUTLINE OF THE EVALUATION PROCESS

The European Approach for Quality Assurance of Joint Programmes was used to evaluate the study programme. The evaluation was conducted in accordance with:

- Procedure for the External Evaluation and Accreditation of Studies, Evaluation Areas and Indicators, approved by the Minister of Education, Science, and Sport;
- Methodology of External Evaluation of Study Fields approved by the Director of the Centre for Quality Assessment in Higher Education (SKVC);
- Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG);
- Standards for Quality Assurance of Joint Programmes in the EHEA approved by the European Ministers responsible for higher education in May 2015.

The evaluation process consists of the following steps:

1. a self-evaluation report (SER) jointly submitted by the cooperating institutions;
2. appointment of a review panel with at least four members;
3. a site visit by the review panel;
4. an external evaluation report (EER) prepared by the review panel;
5. a response from the HEI(s) regarding any errors of fact in the EER;
6. the EER reviewed and approved by the Study Assessment Committee (an external advisory body for SKVC);
7. decision regarding accreditation and it publication;
8. possibility to appeal;
9. follow up activities.

The programme is assessed against the standards defined by the European Approach for Quality Assurance of Joint Programmes. Each substandard and/or standard is assessed as the following:

- Compliant: The programme is entirely or to a large extent in alignment with the standard which is implemented in an effective manner, and the principle/spirit of which is followed in practice.
- Partially Compliant: Some aspects or parts of the standard are met while others are not. The interpretation of the standard is correct, but the manner of implementation is not effective enough.
- Non-Compliant: The programme fails to comply with the standard.

One of the following accreditation decisions is taken on the basis of the approved EER and the accreditation advice provided by the panel:

- **Accreditation granted for 6 years;**
- **Accreditation not granted.**

1.2. REVIEW PANEL

The review panel was appointed in accordance with the Reviewer Selection Procedure as approved by the Director of SKVC and the requirements for panel members defined by the European Approach for Quality Assurance of Joint Programmes in consultation with the quality assurance agencies of the higher education institutions involved in the delivery of the programme.

The composition of the review panel was as follows:

1. Prof. Miguel Correia, Full Professor, Department of Computer Science and Engineering, Instituto Superior Técnico, Universidade de Lisboa, Portugal (chair)
2. Prof. Andrea Prati, Full Professor of Computer Engineering, Department of Engineering and Architecture, University of Parma, Italy
3. Prof. dr. Simona Ramanauskaitė, Full Professor at Vilnius Gediminas technical University, Department of Information technology, Lithuania
4. Pijus Akelis, Futurae Media, Lithuania (social partner)
5. Mia Brzakovic, Trinity College Dublin, School of Engineering, Department of Mechanical, Manufacturing and Biomedical Engineering (student)

The review was coordinated by:

Study evaluation division's Chief officer Gustas Straukas

1.3. SITE VISIT

The site visit was organised on the 17th of January 2024. All members of the panel were present physically, but some members of the staff of the proponent universities were remote.

Meetings with the following members of the staff and stakeholders took place during the site visit:

- Senior management and administrative staff of the universities
- Senior management and administrative staff of the faculties
- Team responsible for preparation of the SER
- Teaching staff
- Social partners including employers.

There was no need for translation and the meetings were conducted in English.

1.4. BACKGROUND OF THE REVIEW

Overview of the programme

Vilnius University (VU), established in 1579, is the largest and oldest institution of higher education in Lithuania. VU is a state public institution governed by the Senate, the Council, and Rector. It offers studies in 12 field groups and 61 study fields, with over 90 Bachelor's and Integrated study programs, 110 Master's and Professional studies programs, nearly 30 research fields for doctoral students, and over 60 residency study programs.

One of the faculties on VU campus is the Faculty of Mathematics and Informatics, this would be the faculty that would implement the study process of the new programme. The primary mission of the Faculty is to conduct and develop studies of informatics, computer engineering, and mathematics at all levels, to foster creative and critical-thinking graduates, and to conduct fundamental and applied research and development.

The joint programme is also expected to be implemented with partner institutions: University of Granada, University of Minho, University of Padova.

Title of the study programme	International Cybersecurity and Cyberintelligence
Partner institution(s)	· University of Granada (Spain) · University of Minho (Portugal) · University of Padova (Italy) · Vilnius University (Lithuania)
State code(s) (if applicable)	Will be granted after accreditation
Study area and/or field	Informatics study field
Type of study (*college/university*)	University studies
Mode of study (*full time/part time)* and nominal duration (*in years*)	Full-time (2 years)
Workload in ECTS	120 ECTS
Degree(s) awarded	Master of computing
EQF and NQF Level(s)	Level 7
Language(s) of instruction	English
Admission requirements	Minimum accredited level of proficiency in English: B2. Bachelor's degree or equivalent Accredited Technology Competence, given by any of the following criteria: . degree in an IT related programme (e.g., Computer Science, Computer Engineering, Information Systems, Telecommunications, Informatics, Software Engineering) or . 2 years of professional experience in an IT related field or

	equivalence to 3 years of training on IT topics.
First registration date	-
Location(s) (where the programme will be offered)	Vilnius (Lithuania), Granada (Spain), Minho (Portugal), Padova (Italy)
Comments (*including remarks on joint or interdisciplinary nature of the programme, mode of provision*)	Joint programme

Documents and information used in the review

The following documents and/or information have been requested / provided by the HEIs before or during the site visit:

- Self-evaluation report and its annexes;
- Syllabus of courses of Vilnius University with additional details;
- Vilnius University module hiring strategy overview.

II. OVERALL ASSESSMENT

Assessment in points by evaluation areas

No.	Standard	Compliance
1.	**Eligibility**	
1.1.	Status	Compliant
1.2.	Joint design and delivery	Compliant
1.3.	Cooperation Agreement	Compliant
2.	**Learning Outcomes**	
2.1.	Level [ESG 1.2]	Compliant
2.2.	Disciplinary field	Compliant
2.3.	Achievement [ESG 1.2]	Partially compliant
2.4.	Regulated Professions	Non applicable
3.	**Study Programme [ESG 1.2]**	
3.1.	Curriculum	Partially compliant
3.2.	Credits	Partially compliant
3.3.	Workload	Partially compliant
4.	**Admission and Recognition [ESG 1.4]**	
4.1.	Admission	Compliant
4.2.	Recognition	Compliant
5.	**Learning, Teaching and Assessment [ESG 1.3]**	
5.1.	Learning and teaching	Compliant
5.2.	Assessment of students	Compliant
6.	**Student Support [ESG 1.6]**	Compliant
7.	**Resources [ESG 1.5 & 1.6]**	
7.1	Staff	Compliant
7.2.	Facilities	Compliant
8.	**Transparency and Documentation [ESG 1.8]**	Compliant
9.	**Quality Assurance [ESG 1.1 & part 1]**	Compliant

ACCREDITATION ADVICE

The panel concludes that the standards are fulfilled and advises **to grant accreditation** to the programme.

III. ASSESSMENT STANDARDS

STANDARD 1. ELIGIBILITY

EVIDENCE, FINDINGS, AND ANALYSIS

1.1. Status

Institutions that offer a joint programme should be recognised as higher education institutions by the relevant authorities of their countries. Their respective national legal frameworks should enable them to participate in the joint programme and, if applicable, to award a joint degree. The institutions awarding the degree(s) should ensure that the degree(s) belong to the higher education degree systems of the countries in which they are based.

EVIDENCE AND FINDINGS

The documents supporting the legal status provided in Annex 1, plus additional documents mentioned in Article 3 of the Cooperation Agreement (Annex 2), show that the four institutions involved are recognised as higher education institutions by their countries' authorities. Moreover, they show that the four national frameworks (Italy, Lithuania, Portugal, Spain) allow their participation in a joint programme and awarding a joint degree. The four universities provided evidence during the meeting that they made the steps necessary for the degree to belong to the higher education degree system of their country, by registering the degree and requiring its assessment, either through the European Approach for Quality Assurance of Joint Programmes (Lithuania, Portugal, Spain), or thought the national accreditation when the previous is not yet accepted (Italy).

ANALYSIS

The previous evidence shows the program meets the requirements above.

JUDGEMENT

The panel assesses the substandard 1.1. as compliant.

1.2. Joint design and delivery

The joint programme should be offered jointly, involving all cooperating institutions in the design and delivery of the programme.

EVIDENCE AND FINDINGS

The program has a clearly defined structure in which students do the 1st semester in Padova (and a course remotely in Minho), then 2nd in Vilnius, the 3rd in Granada, and finish the program in the University of Minho. Each university provides a set of courses and Minho also organises the final exercise and thesis defence. The courses provided are clearly complementary. During the assessment meeting (Vilnius, Jan 17th, 2024), the teams from the four universities have clearly shown that they prepared the proposal together, with the full involvement and commitment of all the four partner institutions.

ANALYSIS

From the evidence above it is clear that the four universities will offer the program jointly, in cooperation, and that they have cooperated in the design of the program.

JUDGEMENT

The panel assesses the substandard 1.2. as compliant.

1.3. Cooperation Agreement

The terms and conditions of the joint programme should be laid down in a cooperation agreement. The agreement should in particular cover the following issues:

- Denomination of the degree(s) awarded in the programme
- Coordination and responsibilities of the partners involved regarding management and financial organisation (including funding, sharing of costs and income etc.)
- Admission and selection procedures for students
- Mobility of students and teachers
- Examination regulations, student assessment methods, recognition of credits and degree awarding procedures in the consortium.

EVIDENCE AND FINDINGS

The program proposal includes the cooperation agreement (Annex 2). This agreement covers:

- Denomination of the degree: first page of the agreement.
- Coordination and responsibilities of the partners: Article 2.
- Admission and selection procedures for students: Article 7.
- Mobility of students and teachers: Article 8.
- Examination regulations, student assessment methods, recognition of credits and degree awarding procedures in the consortium: Articles 10 and 11.

The cooperation agreement is signed in October 2022 and will remain valid for a period of four (4) years. Then it could be extended on joint agreement of the consortium members.

ANALYSIS

From the evidence above, it is clear that there is a Cooperation Agreement and that it covers the required issues. The consortium together prepared project proposals and already participates in additional projects close to the Arqus European University Alliance. This indicates strong collaboration between the partners and commitment for joint activities.

JUDGEMENT

The panel assesses the substandard 1.3. as compliant.

CONCLUSIONS (STANDARD 1)

COMMENDATIONS

The program proposal justifies that the program fulfils all eligibility criteria.

RECOMMENDATIONS

To address shortcomings

There are no recommendations related to the program eligibility.

Suggestions for further improvement

There are no suggestions related to the program eligibility.

STANDARD 2. LEARNING OUTCOMES

EVIDENCE, FINDINGS, AND ANALYSIS

2.1 Level [ESG 1.2]

The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualifications framework(s).

EVIDENCE AND FINDINGS

The program is aligned with the FQ-EHEA as it provides the qualifications that signify the completion of a second cycle. In the program students fulfil 90 ECTS courses in different aspects of cybersecurity and cyberintelligence (the topics of the program) and 30 ECTS in a thesis, in a total of 120 ECTS.

The program has also a sound evaluation and assessment methodology that assures that: students demonstrate knowledge and understanding of the topics (mainly through course and thesis assessments); that they are able to apply that knowledge (final exercise, thesis); that they have the ability to integrate that knowledge handle complexity and uncertainty (courses, final exercise, thesis); that they can communicate in the area (thesis); and that they have learning skills (thesis).

The procedure for the external evaluation and accreditation of studies from Lithuania (ID 2023-16293) requires that the program is aligned with the Descriptor of the Group of Studies of Computing. This descriptor states that the graduates of a second cycle in the group of study fields of computing have to achieve the learning outcomes listed in Annex 3 of that document, in “All fields” and “Informatics”. The panel considers that the program will provide all the learning outcomes in these categories, including all groups: 1. Knowledge and its application; 2. Research skills; 3. Special abilities; 4. Social abilities; 5. Personal abilities. The research skills are not separately defined among the study program learning outcomes. This is expressed more specifically in learning outcomes L1.1 - L1.3, indicating its application in the cybersecurity area. During the assessment meeting, the panel received the justification that research skills are transmitted in most of the courses.

ANALYSIS

The evidence above strongly suggests that the learning outcomes are fully aligned with the FQ-EHEA and other applicable frameworks.

JUDGEMENT

The panel assesses the substandard 2.1. as compliant.

2.2 Disciplinary field

The intended learning outcomes should comprise knowledge, skills, and competencies in the respective disciplinary field(s).

EVIDENCE AND FINDINGS

The disciplinary field of the program, cybersecurity, is gaining prominence and is yet not fully established. There are a few attempts to organise the field from the educational point of view. One of the most prominent being the Joint Task Force on Cybersecurity Education, which provided "Curriculum Guidelines for Post-Secondary Degree Programs in Cybersecurity". The program being evaluated has 12 mandatory courses and the same number of optional courses, covering well the knowledge areas provided in those curriculum guidelines and similar documents, as shown in Annex IV of the proposal (e.g., in the matrix provided). The level of intersection among that large number of courses (24 courses) is quite small, so in fact the range of topics covered is broad. The program also included less common, therefore very interesting, angles on cyberintelligence and on international aspects of cybersecurity. No missing core knowledge, skills, or competencies of the field were identified.

ANALYSIS

The evidence shows the intended learning outcomes do comprise knowledge, skills, and competencies in the field of cybersecurity and cyberintelligence.

JUDGEMENT

The panel assesses the substandard 2.2. as compliant.

2.3 Achievement [ESG 1.2]

The programme should be able to demonstrate that the intended learning outcomes are achieved.

EVIDENCE AND FINDINGS

The project proposal, mainly in Section 2.3, provides an argument that the program can demonstrate that the intended learning outcomes are achieved. The argument starts with a list of well-known cybersecurity skills and competences (architecting secure systems, handling security events and incidents, etc.) and

explains that they are taught and learned as expected in a second cycle (masters) program, starting with the different courses included in the program. Then, the argument goes that the learning outcomes are assessed with exams but also that training has a particularly important role in this field. Training is assessed in courses and in the final exercise. In the syllabi there are no defined levels for each course unit learning outcomes, while evaluation criteria usually are provided in quite general form.

During the site-visit to Vilnius University, it was also possible to assess the good laboratorial conditions available in Vilnius University and to learn that the other 3 universities have similar conditions. Finally, the proposal explains that communication and group work skills are very important in the field and that they are covered in the program.

ANALYSIS

The evidence above suggests that the program is generically able to demonstrate that the intended learning outcomes are achieved. In fact, the study program structure, topic coverage indicate the program learning outcomes cover a wide range of cybersecurity area skills. The idea of doing a "Capture the flag" practical exercise to evaluate students skills at the end of the studies is valuable, as it allows testing the students' skills in action and integrate different competencies evaluation in one testing activity.

Nevertheless, the current version of the syllabi does not reveal systematic and clearly defined learning outcome evaluation methodology. The selected approach to define the evaluation criteria in an abstract fashion has an advantage: the teacher can adapt to the changed market needs and technology shift. However, it does not guarantee the evaluation of the learning outcomes will remain on the initially planned level and not shift with time. Moreover, the lack of more detailed evaluation criteria does not guarantee the clarity of the evaluation.

JUDGEMENT

The panel assesses the substandard 2.3. as partially compliant.

2.4 Regulated Professions

If relevant for the specific joint programme, the minimum agreed training conditions specified in the European Union Directive 2005/36/EC, or relevant common trainings frameworks established under the Directive, should be taken into account.

ANALYSIS

The minimum agreed training conditions specified in the European Union Directive 2005/36/EC, or relevant common training frameworks established under the Directive are not applicable for the study programme.

JUDGEMENT

The panel assesses the substandard 2.4. as not applicable.

CONCLUSIONS (STANDARD 2)

COMMENDATIONS

The program proposal justifies that the program is sound in terms of learning outcomes.

RECOMMENDATIONS

To address shortcomings

None.

Suggestions for further improvement

The course unit learning outcomes should be more closely adjusted to the study program learning outcome full cognitive skill achievement. Course evaluation could be more oriented on course unit learning outcome rather than whole course evaluation. This would be in alignment on competency-based student evaluation and would lead to more smooth micro credentials implementation. Current practice does not allow traceability of each learning outcome achievement level and could lead to cases, when students are missing some learning outcomes as aggregated course evaluation is used, rather than evaluation of each learning outcome.

STANDARD 3. STUDY PROGRAMME [ESG 1.2]

EVIDENCE, FINDINGS, AND ANALYSIS

3.1. Curriculum

The structure and content of the curriculum should be fit to enable the students to achieve the intended learning outcomes.

EVIDENCE AND FINDINGS

The structure of the study program is based on the "National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework"

(https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-181.pdf). This framework categorises and describes cybersecurity work highlighting the knowledge, skills, and abilities needed for different cybersecurity work categories. The seven NICE framework categories group *"… work and workers that share common major functions, regardless of job titles or other occupational terms"*.

There is a direct alignment between the learning outcomes and courses of the study program and the seven NICE framework categories, plus one additional category called "Soft Skills". In total there are 23 learning outcomes. Those will be achieved in 12 mandatory courses (72 ECTS) and 4 optional (selected from 3 separate lists of options) courses (18 ECTS). Data on how learning outcomes will be evaluated and/or educated in the last semester was not provided in the initial set of documents. During the last semester a set of 3 courses (30 ECTS, where 21 ECTS is dedicated to master thesis), oriented on final students' evaluation are planned, but there were no syllabi of the courses as well as the learning objectives were not mapped to those courses. The syllabus for those courses was requested during the meeting and later provided, but the provided Master Thesis course unit description lacks details: prerequisites are not listed; the learning outcomes are very general; assessment criteria are very general and do not reflect the expected level of the master thesis; the hour distribution corresponds to a different number of ECTS than what appears in the SER.

An analysis of how NICE framework categories and specialty areas relate to the study program learning objectives and how the learning objectives are reflected in each course was executed by the experts. This allowed us to understand that the program learning objective matrix contradicts the learning outcomes listed in some course syllabi: some courses were linked to certain study program learning outcome, but were not provided in the syllabi; additional courses, not listed in the matrix contained course unit learning outcomes, mapped to certain study program learning outcomes.

In addition to the mandatory courses, additional courses are provided to students. In the first semester students have to select one course out of seven available ones:

1. Mobile security;

2. Cyberphysical and IoT security;
3. Machine Learning techniques for event correlation;
4. Formal methods for cyberphysical systems;
5. Quantum cryptography and security;
6. Privacy-preserving information access;
7. Law and data.

During the second semester, students select one of two available courses:

1. Malware;
2. Rapid reaction and first response.

For the third semester students choose two out of three available courses:

1. International cooperation in cyberspace;
2. Cyberwarfare;
3. Post-quantum cryptography.

Students' practical skills on a "Capture the flag" type game will be tested during the last semester (as a 3 ECTS course, assigned 70 hours). Besides that, students will also have to complete a master thesis (21 ECTS or, as listed in the syllabi, 640 hours), dedicated more to research work. Additionally, experts' seminars are scheduled (as a course of 6 ECTS, 30 hours), which are part of the master thesis. Officially it is located in the 4th semester but it is planned to be executed during the whole 2 year period.

ANALYSIS

The study program content covers a wide range of topics and cybersecurity areas. As the *"… study programme aims at qualifying students for a professional career in the cybersecurity field with emphasis in international relations and the cyberintelligence domain"*, the wide range of topics matches the vision.

The study program is only partially aligned with the NICE framework, as not all specialty areas are covered. There is little attention on soft skills. Added soft skill category with 3 learning objectives reflects the lack of attention to soft skills as well - communication and continuous learning skills are developed by several mandatory courses, while collaboration skills are developed just in one of the mandatory courses. This contradicts the vision presented during the visit to Vilnius University that the students will learn how to educate and train others, therefore will be valuable in the growth of cybersecurity awareness in the organisation. No competencies were indicated to educate these competencies.

The current syllabi descriptions in the field of students' evaluation are oriented to course evaluation, rather than competency evaluation. There is no data in the syllabi to define how each course unit learning outcome threshold value will be estimated, is there any requirement to pass all course unit learning outcomes at a certain level or not. Since portions of the study program learning outcomes are only covered by one

mandatory course, whereas others are covered by 9 course unit outcomes, the question raised about how can the balance between learning outcome development and evaluation be improved.

In Vilnius University courses, the course topics were very general. After request from the experts, the topic descriptions were extended. This provided more detailed information on what degree and level of depth will be developed within the 3-4 very general topics. Current syllabi at all institutions now have a similar level of description of the course topics.

The jointness of the program among four different institutions is implemented not in a competency area distribution but more oriented on students' mobility aspects – during the first three semesters the students will spend the semester in one specific country, which will change every semester. This will guarantee more hands-on education, when only one course will be taught fully online (during the first semester). While all partners have needed competencies in cybersecurity, the synergy of the four partners will guarantee the international experience and wider perspectives of the cybersecurity area (each partner will supplement the overall portfolio of study program competencies).

As mentioned above, most of these issues pertain to the management of study programs and the ability to ensure a consistent and clear evaluation of students' competencies. Meanwhile, if all planned study courses will cover the topics and develop the competencies mentioned during the visit to Vilnius University, the students will be ready for market needs. They will cover all planned study programme learning outcomes.

JUDGEMENT

The panel assesses the substandard 3.1. as partially compliant.

3.2. Credits

The European Credit Transfer System (ECTS) should be applied properly and the distribution of credits should be clear.

EVIDENCE AND FINDINGS

The proposal indicates the ECTS credits assigned to every course of the program and the distribution is consistent.

All four universities have different regulations regarding the allocation of 1 ECTS credit to course hours and the proportion between classwork and homework hours. Those are the following:

- at Universidad de Granada: 1 ECTS credit corresponds to 25 hours of coursework, typically 7,5 hours classwork + 17,5 hours homework;
- at Università degli Studi di Padova: 1 ECTS credit corresponds to 30 hours of coursework, typically 8 hours of classwork + 22 hours of homework;

- at Vilnius University: 1 ECTS credit corresponds to 26 hours of coursework, typically 9,6 hours of classwork + 16,4 hours of homework;
- at Universidade do Minho: 1 ECTS credit corresponds to 28 hours of coursework, typically 5 hours of classwork + 23 hours of homework.

As part of the visit to Vilnius University, it was stated that students would be introduced to the differences in workload in each country. This should not cause any issues for the students. Most of the courses are 6 ECTS-credits or at least a repetition of 3 ECTS-credits. The fixed step of ECTS-credits in the courses leads to an adjustment of the student workload to the planned courses, not vice versa.

The composite structure of the Master Thesis course creates some uncertainty in relation to ECTS distribution. The credits of the master thesis are composed of three different parts: Expert seminars on cybersecurity and cyberintelligence trending topics (6 ECTS, 30 hours); Practical hands-on defence-attack exercise (3 ECTS, 80 hours); Thesis dissertation elaboration (21 ECTS, 640 hours). The hour distribution does not match the ECTS distribution among those parts. Moreover, in Lithuania, according to the Descriptor of the Group of Studies of Computing, at least 30 ECTS should be dedicated for the master thesis. During the assessment meeting (Vilnius, Jan 17th, 2024), master thesis was defined as research-oriented activities on an individual topic. The current format of the last semester does not comply with the definition of the final master thesis only. It contains course elements as well.

ANALYSIS

The selected approach of fixed ECTS-credits for each course leads to easier study program administration. The back side is the planning of students' workload in each course to correspond to the national regulations of each partner institution. Taking into account the students' workload planning is highly variable because of different students' characters, professors' approach to the teaching process and other aspects, the distribution between course ECTS-credits seems logical and justified. From the provided syllabus, only the Research Project course design in terms of the number of hours can be argued.

The presentation of national and institutional differences, as well as each course's detailed workload plan presentation, makes it easier for students to understand their workload. Students may develop inaccurate expectations of course workload due to varying topic granularity levels in different course syllabi. If students get used to the average workload for one course or event topic in one university, the different workload in another country for the same learning unit might cause iteration for more sensitive students.

Universidad de Granada and Università degli Studi di Padova have a very accurate proportion of the courses (the same number of classes and overall hours for the same ECTS-credits course). Vilnius University has 32 contact hours for 6 ECTS-credits courses, with 160 hours in total, except one course where 6 contact hours are dedicated to the Research Project course out of 156 hours. The hour distribution for this course could be adjusted because it is the first course oriented on research, rather than speciality topics. Only 6 contact hours are dedicated to it. In light of the various purposes of the course, students should receive more consultation and be able to discuss their intermediate results instead of studying independently and presenting only the final results.

JUDGEMENT

The panel assesses the substandard 3.2. as partially compliant.

3.3. Workload

A joint bachelor programme will typically amount to a total student workload of 180-240 ECTS-credits; a joint master programme will typically amount to 90-120 ECTS-credits and should not be less than 60 ECTS-credits at second cycle level (credit ranges according to the FQ-EHEA); for joint doctorates there is no credit range specified.

The workload and the average time to complete the programme should be monitored.

EVIDENCE AND FINDINGS

The master study program is 120 ECTS-credits. This meets the requirement for a master programme to have 90-120 ECTS-credits. During the first three semesters students have 4 mandatory courses (24 ECTS-credits) and one or two optional courses (6 ECTS-credits). The last semester consists of master thesis (21 ECTS-credits), expert seminars (6 ECTS-credits) and final team exercise (3 ECTS-credits). This leads to 30 ECTS-credits per semester. However, in the self-evaluation report and during the visit to Vilnius University it was mentioned that the 6 ECTS-credits of experts seminars will be distributed during the whole 2 year studies, not just in the last semester.

The study program is strictly structured. Optional courses are presented in appropriate semesters while the rest of the courses are mandatory. In case of course failure, possibilities to retake the course exam are indicated (at the beginning of the next semester). This should lead to a situation in which all students are able to complete their studies in 2 years.

For joint study programme accreditation, Italy does not accept the European Approach. Therefore, Università degli Studi di Padova already went through the national study program accreditation process.

ANALYSIS

Taking into account that the study program is accredited separately in Italy and the total student workload is 120 ECTS-credits, this will meet the requirements of all four joint program partners. As a result of the students being distributed in different partner institutions for the master's thesis course, Universidade do Minho offers the smallest amount of courses in the study program. This might raise a question whether this student's involvement in Universidade do Minho courses is enough to get a joint diploma from this institution. However, during the visit to Vilnius University, representatives from Universidade do Minho said

that there will be no issues. The defence procedures will be the same and all partners will participate in the public defence of the master thesis.

There is a question regarding the ex-ante accreditation of the master's program or the future recognition of an ex-post accreditation decision based on the European Approach, primarily due to the Lithuanian national requirement to dedicate at least 30 ECTS credits for that particular thesis, although the programme was proposed before the new legal act that imposes a lower requirement of 15 ECTS. The 30 ECTS requirement is presented in the legal act, order on approval of the descriptor of the group of study field of computing (https://www.e-tar.lt/portal/lt/legalAct/7b24f5b0812b11ed8df094f359a60216). The description of the field of study is a key document that higher education institutions rely on when preparing new or improving existing programs in a certain field of study (https://skvc.lt/default/lt/kokybes-uztikrinimas/krypciu-aprasai). At the moment only 21 ECTS-credits are dedicated to master's thesis at the moment. A research project (6 ECTS-credits) and experts' seminars (6 ECTS-credits) can be used to fill the credit gap. However, the current description of the research project and the missing presentation of experts' seminars do not fully align with the concept of the master's thesis. Properly adjusting the course concept and course unit outcomes this approach could even provide needed time for building a more mature topic and research implementation for the master thesis.

JUDGEMENT

The panel assesses the substandard 3.3. as partially compliant.

CONCLUSIONS (STANDARD 3)

COMMENDATIONS

The study program learning outcomes are referenced by the NICE framework. This supports a more justified list of competencies cybersecurity specialists need.

The approach to moving all students to a different country for each semester has some administrative issues. However, at the same time, it allows for more intense international experience in different countries/universities and provides a face-to-face learning experience, rather than remote studies in local countries or short term mobility.

RECOMMENDATIONS

To address shortcomings

The course descriptions and course unit outcomes should be revised to assure more accurate mapping between study program learning outcomes and implementation in each course.

Attention should be paid to updating the master thesis concept, and distributing it across multiple courses. This would allow us to meet Lithuanian requirements as well as lead to a longer period for master thesis preparation, continuous research idea identification and implementation.

Suggestions for further improvement

Provide a more outcome-oriented student evaluation course syllabus or methodology. Current systems do not define what criteria must be satisfied to mark the course unit outcome as achieved by the student. It leaves room for interpretation and possible course quality shifts in time or when the teaching staff changes.

STANDARD 4. ADMISSION AND RECOGNITION [ESG 1.4]

EVIDENCE, FINDINGS, AND ANALYSIS

4.1. Admission

The admission requirements and selection procedures should be appropriate in light of the programme's level and discipline.

EVIDENCE AND FINDINGS

The SER and interview findings reveal that Granada University will lead the admission and selection process for the program, with all partner universities forming a selection committee with a member from each of the partnering universities. The annual minimum and maximum student intake will be determined by the program board and published on the website, along with general information and advice for applicants. The application deadline and accepted student numbers will be decided by December each year. The University of Granada, as the coordinating institution, will administer the application process and notify applicants of selection outcomes within 12 weeks after the deadline.

Applicants are not required to have completed their Bachelor's degree at the time of application, but it is mandatory to possess a Bachelor's degree at the beginning of the program at the latest. English proficiency at the B2 level is required, and various documents, including a completed application form, ID/passport copy, Bachelor's degree certificate (or equivalent and Accredited Technology Competence, given by any of the following criteria: degree in an IT-related programme (e.g. Computer Science, Computer Engineering, Information Systems, Telecommunications, Informatics, Software Engineering) or 2 years of professional experience in an IT related field or equivalent to 3 years of training on IT topics), academic transcripts, proof of prior experience (CV), motivation letter, at least 2 recommendation letters from university or employer, document summarising previous work or projects carried out by the applicant in the field of technology and additional information related to the program (3 pages maximum, where appropriate), must be submitted in English.

The admission process involves a two-step procedure, starting with the assessment of minimum criteria, including English proficiency, a Bachelor's degree or equivalent, and accredited technology competence. Successful applicants proceed to the second phase, involving interviews, the details of which will be agreed upon and published on the program website. The selection criteria for the second step include communication skills, technology expertise, motivation, group work ability, and academic achievements.

Selected students will receive individual notifications of their admission results, along with further information about the commencement of studies and mobility periods at partner universities. The entire admission process is designed to ensure a thorough evaluation of applicants based on academic, linguistic, and interpersonal criteria, contributing to the program's commitment to excellence and student success.

ANALYSIS

The universities have a well-thought process to ensure efficiency in processing applications, ensuring a seamless and prompt evaluation of prospective students.

The admission section exhibited transparency by providing clear and accessible guidelines, facilitating a straightforward understanding of application requirements.

The admission team, composed of members from each of the universities, has a good structure to create and conduct a thorough and comprehensive review of applications, ensuring a fair and comprehensive assessment of each candidate's qualifications.

The universities demonstrate inclusivity by considering a diverse range of qualifications, and promoting equal opportunities for applicants with varied academic and professional backgrounds.

The universities' commitment to timely admission decision-making will positively impact applicants, providing clarity and reducing uncertainty in the application process.

Clear and timely communication regarding the admission process and requirements on the website reflects the institutions' dedication to keeping applicants well-informed throughout their application journey. The website was not published at the time this evaluation process was conducted but from the interviews, it was indicated that all the necessary elements will be included.

The admission process aligns with international standards, providing the opportunity for the universities to maintain excellence and integrity in their admission practices.

JUDGEMENT

The panel assesses the substandard 4.1. as compliant.

4.2. Recognition

Recognition of qualifications and of periods of studies (including recognition of prior learning) should be applied in line with the Lisbon Recognition Convention and subsidiary documents.

EVIDENCE AND FINDINGS

Study performances within the Arqus Alliance universities are recognised and grades are converted through the integrated study programme, adhering to the principle of equivalence outlined in the Cooperation Agreement for implementing the Arqus Joint Masters program "International Cybersecurity and Cyberintelligence".

The recognition of qualifications and study periods beyond the consortium universities, including prior learning, complies with the Lisbon Recognition Convention and associated documents. The recognition process is centred on learning outcomes, with detailed procedures specified in the examination regulation.

English language proficiency, crucial for participation, is required to meet at least a B2 level of the Common European Framework of Reference for Languages (CEFR) or its equivalent. This proficiency is verified in accordance with institutional regulations and the Agreement for the automatic recognition of language certificates and language competence assessment within the Arqus alliance, simplifying language skills accreditation.

The coordination and documentation of the recognition procedure are the responsibility of the University of Granada, serving as the coordinating institution. However, the ultimate decision regarding recognition lies with the programme board, ensuring a comprehensive and standardised approach across the Arqus Joint Masters program.

ANALYSIS

The universities showcased inclusivity by effectively recognising a diverse range of prior academic qualifications and professional experiences. While this should be supported, it will be necessary to have clear guidelines for the prospective applicants and students regarding the requirements to apply and later enrol on this programme.

The universities demonstrated a commitment to the principles outlined in the Lisbon Recognition Convention, ensuring that the recognition of qualifications and periods of studies aligns with international best practices.

Recognition policies reflect inclusivity, acknowledging a variety of qualifications and periods of studies in line with the principles outlined in the Lisbon Recognition Convention.

JUDGEMENT

The panel assesses the substandard 4.2. as compliant.

CONCLUSIONS (STANDARD 4)

COMMENDATIONS

The programme coordinators showed great knowledge about the admission and recognition requirements and aligned them with the best practices.

RECOMMENDATIONS

To address shortcomings

Some of the requirements, such as the one related to non-university education may be more clearly presented by adding more detail and ensuring that applicants can check their eligibility without the need for additional clarifications from the members of the admission team.

The second part of the selection process involves the interview and the details about this section do not uncover what this process will entail. However, in the interviews with the universities' members, it was stated that they have a clear vision about this section and that it will include a short dialogue with the candidate following the tech-related problem-solving task.

In general, information about the program and admissions has to be clearly conveyed due to the level of complexity and mobility involved.

Suggestions for further improvement

Clear language and guidelines in terms of specific requirements for the application and information about the second part of the selection process would benefit both the applicant and the involved institutions. The partnering universities already defined this information and it would be advised that this is included on the websites of the universities.

STANDARD 5. LEARNING, TEACHING AND ASSESSMENT [ESG 1.3]

EVIDENCE, FINDINGS, AND ANALYSIS

5.1. Learning and teaching

The programme should be designed to correspond with the intended learning outcomes, and the learning and teaching approaches applied should be adequate to achieve those. The diversity of students and their needs should be respected and attended to, especially in view of potential different cultural backgrounds of the students.

EVIDENCE AND FINDINGS

Based on the syllabi of the courses, there is a good fit between the designed programme and the learning outcomes, as well as to the teaching approaches used to achieve them. In most of the course descriptions, a solid list of topics is provided and it is aligned with the assessment tasks. Details on learning outcome evaluation rather than task or topic is not provided.

In the initial version of the SER, not all courses had the same topic detailing level - Vilnius University used up to four very general topics in the initial syllabi provided - but this issue was solved in the versions provided later as additional material.

The diversity of students, their background and needs are taken into consideration properly. SER describes in Section 2.3 at page 11, that the students may achieve results differently, also based on the specific professional profile they aim at (operation and maintenance, management, etc.). Also, section 3.1 at pages 15-16 further elaborates on this, by dividing the classes in those addressing technical skills, or legal/economic/social/political aspects, etc.. The general flexibility of the programme in which, together with 12 mandatory classes there are 4 optional classes to be chosen among 12 proposals, allows the students to adapt the programme to their previous background and future needs.

ANALYSIS

After the new versions of syllabi provided by Vilnius University, they are now adequate and correspond to the intended learning outcomes. The learning and teaching approaches are also adequate.

JUDGEMENT

The panel assesses the substandard 5.1 as compliant.

5.2. Assessment of students

The examination regulations and the assessment of the achieved learning outcomes should correspond with the intended learning outcomes. They should be applied consistently among partner institutions.

EVIDENCE AND FINDINGS

The assessment of achieved learning outcomes (LOs) is well described. For all the classes, the syllabi report extensive details of examination regulation, also divided by learning outcomes. This gives the students a complete coverage of which approach they need to have to achieve each specific LO. The foreseen examination methodologies (written and practical exams, teamwork, classroom discussion, etc.) fit very well with the learning outcomes of the programme, where communication, group work and leadership play a key role for future job duties and professional profiles.

The study course assessment methodology is divided into several parts: course unit learning outcomes are linked with assessment methods; assessment strategy defines weights, deadlines and general assessment guidelines. Those two parts are not clearly linked, therefore there are no clear details how the threshold course unit learning outcome level achievement will be evaluated and taken into account.

Most of the syllabi also include a clear explanation of the assessment criteria in terms of grade scale and points, although it is also always the same. Abstract criteria for the grade scale are defined, leaving the space for teachers' flexibility to change the assessment criteria.

The examination regulations and assessment of outcomes are quite consistent among the partner institutions.

In section 3.3, page 17, of SER it is written that *"Students that were not able to pass a class final exam in the corresponding semester, will need to retake the exam in a supplementary session, to be held before graduation"*. Of course, this is good, but SER does not report how this can be taken when the student has already moved to another university/country.

During the visit, this aspect was clarified and three possibilities are available: (i) oral remote exam, (ii) travel of the student to take remaining exams, (iii) written exam under supervision of a local teacher involved in the programme.

ANALYSIS

As reported in substandard 5.1, the level of description of syllabi needed to be increased before the start of the programme in Vilnius. This was done, sending the updated versions of Vilnius University courses' syllabi. Those have more detailed topic descriptions. Assessment criteria can also be expanded and detailed.

JUDGEMENT

The panel assesses the substandard 5.2 as compliant.

CONCLUSIONS (STANDARD 5)

COMMENDATIONS

The designed programme allows a good level of flexibility for different incoming students. The course syllabi give the students a complete coverage of which approach they need to have to achieve each specific learning outcome.

RECOMMENDATIONS

To address shortcomings

There are no recommendations related to learning, teaching and assessment.

Suggestions for further improvement

More detailed description and diverse assessment criteria in the syllabi.

The syllabi form could be improved to present the course unit learning outcome achievement level evaluation and how the assessment will guarantee that all learning outcomes will be achieved in at least threshold level.

STANDARD 6. STUDENT SUPPORT [ESG 1.6]

EVIDENCE, FINDINGS, AND ANALYSIS

6 Student support [ESG 1.6]
The student support services should contribute to the achievement of the intended learning outcomes. They should take into account specific challenges of mobile students.

EVIDENCE AND FINDINGS

The partnering universities, as outlined in the SER, committed to providing comprehensive support, encompassing study-related queries, financial assistance, internship placements, and visa and residence permit support.

According to documentation provided, administrative staff at each university will communicate information to students through various channels, including phone, email, and live consultations during working hours.

Career counselling will be one of their main focuses, with advice, support, and peer-to-peer assistance available, including self-awareness tests, job interview simulations, and career seminars tailored to student needs.

Developing alumni networks are marked as an important aspect for partner universities, aiming to create a sense of community, professional networking, and ongoing support for graduates.

Psychological support for students facing difficulties in their studies or personal lives is indicated as a core commitment of partner universities. They have dedicated counselling centres, mentorship programs, and psychological assistance services to address students' various needs.

Students with disabilities will receive targeted assistance, including social intervention programs, support for learning disabilities, and initiatives to enhance physical accessibility and inclusivity. In addition to that, in the interviews it was mentioned that students with disabilities will have advantage when booking rooms so that the environment can support their requirements at the time of arrival.

Each partner institution will appoint a local coordinator responsible for implementing and executing the study program, ensuring timely and adequate support for students.

Students of the program are eligible for grants, state loans, and financial support, with information provided during the initial lectures.

Accommodation assistance is a shared commitment, with universities offering various options, including student dormitories, private market recommendations, and dedicated accommodation offices to support students in finding suitable living arrangements. The panel also learned that there are enough facilities to accommodate the incoming students, and that in some cities more infrastructure is expected to be built for the future generations.

ANALYSIS

The range of services including academic, career, psychological, and disability support, create a comprehensive network for student well-being:

- Academic Support - The universities address academic queries, financial concerns, and internship placements, ensuring students receive necessary guidance for a successful academic journey.
- Career Development - Career counselling, alumni networks, and virtual platforms connect students with practical resources and opportunities, aligning with the goal of preparing them for future professional life.
- Psychological Support - Partnering universities prioritise the mental health of students, offering counselling services and interventions to address challenges such as stress, anxiety, and personal relationships.
- Disability Support - There is a clear focus on inclusive education, with strategies like flexible examination conditions, physical accessibility improvements, and assistive technologies, ensuring that students with disabilities receive tailored support.
- Local Coordination - The appointment of local coordinators demonstrates an understanding of the challenges faced by mobile students, providing a direct point of contact for timely and appropriate assistance.
- Financial Support - Grant opportunities, state loans, and dedicated financial aid for students with disabilities contribute to reducing financial barriers and align with the diverse needs of mobile students.
- Accommodation Assistance - The commitment to helping students find suitable accommodation, whether through dormitories or private options, acknowledges the specific challenges faced by students who are often relocating.

The comprehensive student support services provided by the partnering universities align effectively with this requirement. Covering academic, career, psychological, and disability support, the universities prioritise a holistic approach to student well-being. These services, including counselling, career development, and financial assistance, collectively address the diverse needs of mobile students, while the appointment of local coordinators reflects an understanding of the challenges associated with relocation. By supporting inclusivity, offering tailored support for disabilities, and assisting in accommodation, the universities enhance the overall learning experience and contribute to the success of students in achieving their academic goals.

JUDGEMENT

The panel assesses the standard 6 as compliant.

CONCLUSIONS (STANDARD 6)

COMMENDATIONS

The needs of student mobility is taken into consideration by all the partnering universities and they ensured to provide support required to make this possible. It is clear that the partnering universities have extensive experience in exchanges and that they are willing to share knowledge and ensure positive experience for their students. All institutions have necessary means to provide the support so that students can achieve the intended learning outcome, and it will be important to make sure students are aware of all available services.

RECOMMENDATIONS

To address shortcomings

None.

Suggestions for further improvement

When the programme starts, there may be the need for a reassessment of the existing structures and procedures based on the structure of the cohorts. In this case it will be important that the partnering universities keep the open-minded approach and conduct regular evaluations in forms of student feedback and ensure all their needs are met in all four locations.

It would be advised to create check-ins with students and follow their progress during the programme, making sure their personal and professional development is on track and that they are informed about all the available services that partnering universities have.

Ensure that students at all times have contact persons who are available and have all necessary information or can direct them to the relevant sectors or staff.

It is important to keep clear and transparent communication throughout the entire duration of the programme and create an atmosphere where students feel welcome to contact the relevant staff in case they need any help during their studies.

For the universities that don't have fully developed peer-to-peer support, it would be highly recommended to invest time in that sector, as students tend to feel more comfortable asking questions and sharing their needs with members who are closer to their age. This would have a positive impact on their overall experience.

STANDARD 7. RESOURCES [ESG 1.5 & 1.6]

EVIDENCE, FINDINGS, AND ANALYSIS

7.1. Staff

The staff should be sufficient and adequate (qualifications, professional and international experience) to implement the study programme.

EVIDENCE AND FINDINGS

The academic staff CVs provided in Annex 9 give an overall good impression. Faculty have extensive academic careers in the field of the study programme. They have also experience writing books and research publications, which is a good demonstration of competence.

During the meeting in Vilnius University, the panel had the opportunity to ask study program related questions. Questions were answered in a quick and clear manner. It gives a good impression that academic staff is well prepared and knows the subject well. All staff members (we talked with) spoke fluent English.

During the meeting, the panel learned that not all academic staff members are hired yet, especially in Vilnius University. The reason is that the study program has not yet started and is waiting for evaluation. In the study documentation there is a description of the hiring process and requirements for each university. Universities also provide descriptions of their faculty evaluation mechanisms. Initially, all universities except Vilnius University provided a list of academic staff, where at least one person is mapped to one course unit. In the case of Vilnius University, one person was responsible for all courses and two more persons were provided as helping ones. During the meeting it was admitted the person is assigned but will not be teaching all the courses, new personnel will be gathered. Despite the existing requirements for certain academic staff positions, it was not clear what persons are planned for the course's delivery at Vilnius University. This was solved as additional information provided by Vilnius University includes teaching staff for most of the courses, although not yet to all.

Universities having regular teaching staff evaluations gives a good impression and shows that universities strive to maintain a high quality of studies. All four Universities also have competence improvement systems for teaching staff. Which is also a very good sign.

ANALYSIS

All universities have a clearly defined hiring process. Teachers are expected to meet high standards.

All universities provide competence improvement systems for teaching staff, which is very important in computer science studies.

There is a concern about Vilnius University's ability to deliver all the planned courses, as its teaching staff is not yet complete. However, there is a plan in place to solve this problem.

JUDGEMENT

The panel assesses the substandard 7.1. as compliant.

7.2. Facilities

The facilities provided should be sufficient and adequate in view of the intended learning outcomes

EVIDENCE AND FINDINGS

Based on provided documentation - all facilities are suitable for this new study program.

All facilities support Eduroam wifi and provide various software tools that could be used by all students. During the visit to Vilnius University, the panel was presented with IT infrastructure that will be used by students and teachers. This infrastructure is cloud-based and allows students to create and manage their own virtual machines in a very quick and easy way. All virtual machines could be accessed by students in any computer or terminal, including at home. Teachers and students have their own local cloud credentials. Representatives from all universities confirmed that modern technologies like virtual machines running in cloud and virtual environments are used.

There are also some extras, which might not directly relate to this study program, but could improve the quality of life for a student. To name a few:

- All universities have self-study rooms that are equipped with required hardware and software. Vilnius University has self-study facilities that are open 24/7.
- University of Padova has an OrariUniPD app that allows students to view and manage lectures and exam session timetables.
- Minho University offers One Button Click Studio (OBS), a studio which is intended for the autonomous production of multimedia content.
- University of Granada offers access to the supercomputer facilities hosted at the Network and IT Services Centre (CSIRC).

Students and academic staff can also use a supercomputer (acquired in 2012) in Lithuania, located in the Faculty of Mathematics and Informatics for scientific research purposes or educational activities. They can use Cloud services, get direct access to some super computer resources or use GRID computing capabilities. Many more features are listed in documentation.

According to documentation - all four universities provides a huge variety of methodological resources that includes :

- Cambridge Journals on Cambridge Core.
- EBSCO database.
- Web of Science
- And many more.

During the visit all representatives were very knowledgeable about the hardware, software and other resources that will be used in this study program. Answers regarding laboratories and tech were answered in a quick and clear way.

ANALYSIS

After reading documentation and visiting Vilnius University and meeting representatives - it is clear that faculties offer enough software and hardware tools that might be needed during this study program.

Facilities offer up to current standards IT infrastructure with many additional software solutions that will improve student's quality of studies.

JUDGEMENT

The panel assesses the substandard 7.2. as compliant.

CONCLUSIONS (STANDARD 7)

COMMENDATIONS

The universities provide an up-to-date IT infrastructure, adequate to supporting the program. They have and provide a variety of methodological resources.

RECOMMENDATIONS

To address shortcomings

None.

Suggestions for further improvement

The consortium should monitor the contracting situation at Vilnius to ensure that the required teaching staff are contracted on time to cover the teaching duties. More generically the consortium should monitor how the teaching staff evolves in the four universities, to guarantee that it remains of very good quality.

STANDARD 8. TRANSPARENCY AND DOCUMENTATION [ESG 1.8]

EVIDENCE, FINDINGS, AND ANALYSIS

8. Transparency and Documentation [ESG 1.8]

Relevant information about the programme like admission requirements and procedures, course catalogue, examination and assessment procedures etc. should be well documented and published by taking into account specific needs of mobile students.

EVIDENCE AND FINDINGS

During the meeting in Vilnius University, tuition fee related questions appeared from the evaluation committee. Even though these questions were answered by study program representatives, clearer documentation on financial aspects could have been presented. It would help the students to understand their possible financial obligations and possibilities for financial support.

The application and admission process is defined in Annex 2. It includes required application documents, selection criteria and selection procedure. During the meeting, questions related to the selection procedure were asked. It was unclear if a person, who has a bachelor's degree in a non IT-related program but with “equivalent to 3 years of training on IT topics” can join this study program.

Annex 4 provides a good learning outcomes and study subjects matrix. It is very beneficial, as long as it is visible to all students from the first semester.

Annex 5 details study subjects. Overall - descriptions are well written and easily understandable. It contains assessment criteria, assessment strategies, required reading lists and additional study subject related information.

Annex 15 provides student life guides, which are very useful considering that students will have to move to a different university every semester.

ANALYSIS

Overall, documentation is informative and transparent. Provided documents and annexes gives a good amount of information about the program's admission requirements, procedures, course catalogue, examination and assessment procedures.

Tuition fee documentation and study descriptions could be improved and/or extended.

While reading study subject descriptions, the review committee noticed that some descriptions could be improved by providing more detailed information about lab related topics and assignments (software used, implementation strategies etc.).

JUDGEMENT

The panel assesses the standard 8 as compliant.

CONCLUSIONS (STANDARD 8)

COMMENDATIONS

No significant inconsistencies.
Documentation gives a good overall understanding of a study program goals and steps to achieve it.

RECOMMENDATIONS

To address shortcomings

No shortcoming was identified by the review panel.

Suggestions for further improvement

Make course syllabus documents publicly available. Potential students should have an opportunity to read an extensive description of every study subject before making the decision.

STANDARD 9. QUALITY ASSURANCE [ESG 1.1 & PART 1]

EVIDENCE, FINDINGS, AND ANALYSIS

9. Quality Assurance [ESG 1.1 & part 1]

The cooperating institutions should apply joint internal quality assurance processes in accordance with part one of the ESG.

EVIDENCE AND FINDINGS

The whole Arqus Alliance has committed to structures and procedures to assure quality of the Alliance, from which the program benefits.

In terms of internal quality assurance, all the expected activities will be ensured, as reported in section 9 at page 50 of SER. In particular, a sample questionnaire for students (with a version for each of the 4 universities) is reported in Annex 13. The Coordinating university will annually require quality reports (performance of students, teaching content and relation with programme objectives, quality assessment, student survey results) from the participating universities.

In addition to the joint QA system (also detailed in Annex 10), each university will put in place their own local QA procedures. In the case of Vilnius University, the Study Programme Committees (SPC) are responsible for QA. SPC consists of academic staff members and representatives of students and social partners.

ANALYSIS

There is evidence of a proper plan-do-check-act cycle for quality assurance in place on all the partner institutions, in accordance with part one of the ESG which shows that there is quite a good QA system planned for the new programme throughout all universities.

JUDGEMENT

The panel assesses the standard 9 as compliant.

CONCLUSIONS (STANDARD 9)

COMMENDATIONS

Quality assurance is granted both in single institutions and jointly.

RECOMMENDATIONS

To address shortcomings

There are no recommendations related to quality assurance.

Suggestions for further improvement

All four universities have different surveys for the student feedback gathering. This might lead to highlights of different aspects of the study quality. Consider the possibility to use unified feedback form in the program, to make sure the results for different courses in different universities are comparable.

IV. SUMMARY

The Master in International Cybersecurity and Cyberintelligence program exhibits a well-defined structure, with students completing semesters in different universities across Europe – Padova, Minho, Vilnius, and Granada. This joint programme, designed collaboratively by the participating universities within the Arqus Alliance, aligns with the FQ-EHEA standards and offers a comprehensive curriculum comprising 90 ECTS in cybersecurity and cyberintelligence courses and 30 ECTS for a thesis.

The programmes' structure draws inspiration from the NICE Cybersecurity Workforce Framework, providing a solid foundation for cybersecurity education. The inclusion of a practical Capture the Flag exercise for skills evaluation is commendable, testing students' abilities in real-world scenarios.

Despite administrative challenges associated with relocating students for each semester, this approach enhances the international experience, fostering face-to-face learning and diverse cultural exposure. The program's flexibility accommodates the needs of incoming students, and the universities demonstrate a commitment to supporting student mobility.

The academic staff exhibit impressive credentials, boasting extensive experience in the field, including academic careers, book authorship, and research publications. The universities also offer up-to-date IT infrastructure and a range of methodological resources.

The main recommendations are:

1. Align course unit learning outcomes more closely with the overall program's cognitive skill achievements.

2. Improve syllabi to include course unit learning outcome evaluation and ensure assessments guarantee threshold-level achievement of all learning outcomes.

3. Shift course evaluation from individual learning outcomes to competency-based student evaluation and facilitate smoother micro-credentials implementation.

4. Provide clear language and guidelines for application requirements and the second part of the selection process on the program's website.

5. Ensure the availability of contact persons for students throughout the program to be able to provide necessary information promptly.

6. Address concerns about Vilnius University's ability to deliver all planned courses due to incomplete teaching staff, ensuring the necessary resources are in place.