



agency for science and higher education



Improvement of quality assurance
and enhancement systems in higher education

**Report
of the Expert Panel
on the Re-accreditation
of the University Postgraduate (Doctoral) Programme**

***Postgraduate Doctoral Study Programme in the Area of Engineering
Sciences, in the Field of Computer Science***

**Faculty of Engineering
University of Rijeka**

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INTRODUCTION

The Expert Panel appointed by the Agency for Science and Higher Education (ASHE) created this Report on the Re-accreditation of the *University Postgraduate (Doctoral) Programme in Computer Science* on the basis of the Self-Evaluation Report of the Programme, other documentation submitted and a visit to the University of Rijeka, Faculty of Engineering.

The Agency for Science and Higher Education (ASHE), a public body listed in EQAR (European Quality Assurance Register for Higher Education) and a full member of ENQA (European Association for Quality Assurance in Higher Education), re-accredits higher education institutions (hereinafter: HEIs) and their study programmes in line with the Act on Quality Assurance in Science and Higher Education (Official Gazette 45/09) and the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10). In this procedure parts of activities of higher education institutions and university postgraduate study programmes are re-accredited.

The Expert Panel is appointed by the Agency's Accreditation Council, an independent expert body, to carry out independent evaluation of post-graduate university study programmes.

The Report contains the following elements:

- Short description of the study programme,
- The recommendation of the Expert Panel to the Agency's Accreditation Council,
- Recommendations for institutional improvement and measures to be implemented in the following period (and checked within a follow-up procedure),
- A brief analysis of the institutional advantages and disadvantages,
- A list of good practices found at the institution,
- Conclusions on compliance with the prescribed conditions of delivery of a study programme,
- Conclusions on compliance with the criteria for quality assessment.

Members of the Expert Panel:

- Professor Bart Lamiroy, Université de Lorraine, France
- Professor Jens Grabowski, Institute of Computer Science, University of Göttingen, Germany
- Professor Michail Giannakos, Norwegian University of Science and Technology, Norway
- Professor Simon Gay, University of Glasgow, UK
- Imran Khan, PhD student, Insight Centre for Data Analysis, University College Cork, Ireland.

The higher education institution was visited by the following Expert Panel members:

- Professor Bart Lamiroy, Université de Lorraine, France
- Professor Jens Grabowski, Institute of Computer Science, University of Göttingen, Germany
- Professor Michail Giannakos, Norwegian University of Science and Technology, Norway
- Professor Simon Gay, University of Glasgow, UK

- Imran Khan, PhD Student, Insight Centre for Data Analysis, University College Cork, Ireland.

In the analysis of the documentation, site visit and writing of the report the Panel was supported by the following representatives of the Agency for Science and Higher Education:

- Irena Petrušić, coordinator
- Ivana Rončević, interpreter at the site visit
- Lida Lamza, translator of the Report.

During the visit to the Institution the Expert Panel held meetings with the representatives of the following groups:

- Management,
- Study programme coordinators,
- Doctoral candidates,
- Teachers and supervisors,

The Expert Panel also had a tour of the library, IT rooms and the classrooms.

SHORT DESCRIPTION OF THE STUDY PROGRAMME

Name of the study programme contained in the licence: Postgraduate Doctoral Study Programme in the Area of Engineering Sciences, in the Field of Computer Science

Institution providing the programme: University of Rijeka

Institution delivering the programme: Faculty of Engineering

Place of delivery: Rijeka

Scientific area and field: Engineering Sciences, Computer Science

Number of doctoral candidates (all): 7

Number of HEI funded doctoral candidates: 4 (assistants employed at that or another HEI or institute).

Number self-funded doctoral candidates and employer-funded doctoral candidates: 3

Number of inactive doctoral candidates: 0

Number of teachers: 19 total

Number of supervisors: 4

Number of doctoral candidates with officially appointed supervisors: 7

Learning outcomes of the programme:

LO 1: Scientific research contribution

- Formulate a hypothesis for scientific research
- Apply a scientific method (theoretical, experimental, analytical, numeric, or similar) with the aim of confirming or rejecting the hypothesis
- Create one's own theories, methods, procedures, models, and other scientific results
- Analyse and revise existing sources and databases with the aim of collecting data needed for carrying out own research

LO 2: Scientific collaboration

- Establish collaboration with other researchers from the country and abroad
- Apply and lead a national/international research project – prepare the project proposal, establish a financial plan, achieve project goals, report regularly on project work
- Independently or as a member of a research group, carry out scientific research and critically evaluate existing theories and research results

LO 3: Dissemination skills

- Present to the wider public and popularise the results of own scientific research
- Publish a research paper in a major international journal
- Publish and present a research paper at an international scientific event (workshop, congress, conference)

LO 4: Social responsibility

- Develop innovative solutions through creative activities with the aim of increasing the knowledge of the society
- Use scientific methods to solve complex economic and other problems
- Take ethical and social responsibility in carrying out scientific research successfully, especially taking into consideration the social relevance of research results.

Structure of programme:

First year:

- Courses from the first semester of doctoral study passed and at least 30 ECTS credits obtained in this way
- Courses from the second semester of doctoral study passed and at least another 12 ECTS credits obtained in this way
- Definition of a general research theme, positively evaluated through a public presentation of initial research results

Second year:

- Positively evaluated public presentation of research results during the first two years of study
- Definition of a specific research question.

Third year:

- Supervisor's written approval for submitting the doctoral thesis topic (proposal)
- Topic (proposal) of doctoral thesis submitted using Form PDS-8.

Taught/research ratio: 30% (42 ECTS taught / 138 ECTS research).

RECOMMENDATION BY THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL

Upon the completion of the re-accreditation procedure and the examination of the materials submitted (Self-Evaluation Report etc.), the visit to the higher education institution and interviews with HEI members in accordance with the visit protocol, the Expert Panel renders its opinion in which it recommends to the Accreditation Council of the Agency the following:

Issue a letter of expectation for the period of at least three (3) years in which the higher education institution should make the necessary improvements, a period that would allow for at least two cohorts of PhD students to graduate.

The visiting Expert Panel was asked to evaluate and assess the quality of a postgraduate programme that has been operating for only one full year. While the Expert Panel has a global positive opinion of the Programme, it considers that the lack of effective operating information over a significant period of time limits its capacity of formulating a definitive assessment. The Expert Panel therefore considers that a follow-up on the observed practices would be beneficial to the Programme.

The Expert Panel considers that the Postgraduate Doctoral Study Programme in the Area of Engineering Sciences, in the Field of Computer Science by the Faculty of Engineering at the University of Rijeka is well thought out, and set up with a series of procedures built upon both existing good practices in other fields of the Faculty and University as well as comparative benchmarking from other sources. It has the resources to successfully operate the Programme.

The Expert Panel did identify some topics to which the Faculty should be attentive. These topics are developed further in this document. Overall, the Expert Panel was very satisfied with the exchanges and the availability of the people involved.

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME

1. The research activity in CS is still quite young and the Faculty should maintain the incentives to increase the quality and impact of their research.
2. All implemented quality assurance procedures seem to be well documented and effectively implemented. The Faculty should make sure that they scale up once the CS program increases its number of enrolled students.
3. Although the Expert Panel did not observe any minority or gender related tensions and the global working atmosphere seems very positive, the Faculty should make efforts and create the appropriate environment to explicitly promote diversity.
4. The Expert Panel has identified a risk related to the potential and quite likely increase of demand in CS post-graduates and graduates. Given the current level of teaching hours of the people involved in the Programme, this may rapidly become a bottleneck and limit the capacity of providing an appropriate quality level and availability for the supervision of the enrolled students.
5. The Expert Panel observed that most of the research is published in lesser renowned/established conferences and journals and advises that the researchers

(including supervisors and PhD students) start targeting journals with high impact factor and tier 1 or tier 2 (highly ranked) conferences in their respective domains. This will help in increasing the quality of research as well as increasing the reputation of the Faculty. The Expert Panel also encourages the Department to take necessary steps encouraging PhD students to publish in highly ranked conferences and journals.

6. The Expert Panel encourages taking necessary steps to attract/hire renowned professor/researchers, in the area of Computer Science, who have a proven track record of acquiring national or international funding so that they can open funded PhD positions.
7. The Expert Panel advises that the University take necessary steps to open scholarships/funded PhD positions to attract talented students (local and international).
8. The Expert Panel appreciates that the Faculty wants to ensure that its awarded PhDs are at a level corresponding to international standards. An important way to achieve this is to include international examiners on thesis assessment committees.
9. The Expert Panel recommends that PhD candidates should be strongly encouraged to write their theses in English.
10. Overall, the Department should strive for global international integration, through attracting PhD students from abroad, securing and leveraging internationally funded projects, engaging in exchange programs for both Faculty members and students, *etc.*

ADVANTAGES OF THE STUDY PROGRAMME

1. The study programme is part of a Faculty with significant experience in running similar programmes and with well-established quality processes. The general management seems to be efficiently functioning and in full support of the programme.
2. The general structure of the programme, the selection process and the various stages for evaluating the progress and ensuring the quality of the candidates is in line with generally adopted practices worldwide.
3. The study programme has the sufficient level of resources (quality of enrolment in the local graduate programme, network of partnership Universities, qualified Faculty members) to operate and expand on a sufficient level of quality.
4. The pool of supervisors is dedicated and highly motivated, the currently enrolled students are very satisfied with the quality of their supervision, availability of their supervisors, the resources made available to them and the general working atmosphere.
5. A general willingness and commitment to create a high standard, internationally integrated doctoral programme.

DISADVANTAGES OF THE STUDY PROGRAMME

1. The current level of scientific output of the Faculty is below par and the number of publications of the Faculty should increase and focus more on higher impact international conferences and journals.
The Expert Panel acknowledges that the Faculty and management are aware of this. Incentives and metrics for improvement have been established.
2. The three year curriculum puts a very strong emphasis on courses in the first semesters of the programme. The Expert Panel feels that this limits the availability of the candidates and hinders or delays the necessary first stages of the actual doctoral work of

the candidates, like focused literature reviews for finding the research gap, definition of a specific research theme including the definition of research questions, planning of case studies and experiments, etc.

3. The overall teaching load on the Faculty members satisfying the criteria for being potential advisors is much higher than the standard regulatory 360 norm hours in the Croatian Higher Education system. This inevitably has an impact on the availability of the advisors for their students, and their time available for quality research.
4. The implementation of the required course credits seem to be too restrictive and untimely. The candidates are required to choose from a restricted set of possible courses before having had the opportunity to fully define their research goals or general scope of their thesis.

EXAMPLES OF GOOD PRACTICE

1. The environment and incentives made available for the candidates is of high quality and ensures that all conditions for a successful outcome of their work are met. Good practices in this are: compulsory and significant stay abroad, clear and documented selection and progress evaluation procedures.
2. Overall well documented and established quality assurance processes on the Faculty level to which all the Faculty staff seems to adhere and seems to follow.
3. A willingness to implement and follow high quality international standards and benchmark with existing other programmes.
4. A general attitude to open assessment of the programme and research for continuous improvement.

COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME

Minimal legal conditions:	YES/NO notes
1. Higher education institution (HEI) is listed in the Register of Scientific Organisations in the scientific area of the programme, and has a positive reaccreditation decision on performing higher education activities and scientific activity.	YES
2. HEI delivers programmes in the two cycles leading to the doctoral programme, i.e., first two cycles in the same area and field/fields (for interdisciplinary programmes), and employs a sufficient number of teachers as defined by Article 6 of the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/10).	YES
3. HEI employs a sufficient number of researchers, as defined by Article 7 of the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-Accreditation of Scientific Organisations and Content of Licence (OG 83/2010).	YES
4. At least 50 % of teaching as expressed in norm-hours is delivered by teachers employed at the HEI (full-time, elected into scientific-teaching titles).	YES
5. Student: teacher ratio at the HEI is below 30:1.	YES
6. HEI ensures that doctoral theses are public.	YES
7. HEI launches the procedure of revoking the academic title if it is determined that it has been attained contrary to the conditions stipulated for its attainment, by severe violation of the studying rules or based on a doctoral thesis (dissertation) that has proved to be a plagiarism or a forgery according to provisions of the statute or other enactments.	YES
Additional/ recommended conditions of the ASHE Accreditation Council for passing a positive opinion	YES/NO notes
1. HEI (or HEIs in joint programmes) has at least five teachers appointed to scientific-teaching titles in the field, or fields relevant for the programme involved in its delivery.	YES
2. In the most recent reaccreditation, HEI had the standard Scientific and Professional Activity marked as at least "partly implemented" (3).	YES
3. The doctoral programme is aligned with the HEI's research strategy.	YES
4. The candidate: supervisor ratio at the HEI is not above 3:1.	YES
5. All supervisors meet the following conditions: a) PhD, elected into a scientific title, holds a scientific or a scientific-teaching position and/or has at least two years of postdoctoral research experience; b) active researcher in the scientific area of the programme, as evidenced by publications, participation in scientific conferences and/or projects in	a) YES b) YES c) YES d) YES e) YES f) Not applicable,

<p>the past five years (table 2, Supervisors and candidates);</p> <p>c) confirms feasibility of the draft research plan upon admission of the candidate (or submission of the proposal);</p> <p>d) ensures the conditions (and funding) necessary to implement the candidate's research (in line with the draft research plan) as a research project leader, co-leader, participant, collaborator or in other ways;</p> <p>e) trained for the role before assuming it (through workshops, co-supervisions etc.);</p> <p>f) received a positive opinion of the HEI on previous supervisory work.</p>	<p>study program is in its 1st year</p>
<p>6. All teachers meet the following conditions:</p> <p>a) holds a scientific or a scientific-teaching position;</p> <p>b) active researcher, recognized in the field relevant for the course (table 1, Teachers).</p>	<p>a) YES</p> <p>b) YES</p>
<p>7. The supervisor normally does not participate in the assessment committees.</p>	<p>YES</p>
<p>8. The programme ensures that all candidates spend at least three years doing independent research (while studying, individually, within or outside courses), which includes writing the thesis, publishing, participating in international conferences, field work, attending courses relevant for research etc.</p>	<p>YES</p>
<p>9. For joint programmes and doctoral schools (at the university level): cooperation between HEIs is based on adequate contracts; joint programmes are delivered in cooperation with accredited HEIs; the HEI delivers the programme within a doctoral school in line with the regulations and ensures good coordination aimed at supporting the candidates;</p> <p>at least 80% of courses are delivered by teachers employed at HEIs within the consortium.</p>	<p>Not applicable</p>

QUALITY ASSESSMENT

	Quality assessment (“high level of quality” or “improvements are necessary”) and the explanation of the Expert Panel
1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE	
1.1. HEI is distinguished by its scientific/ artistic achievements in the discipline in which the doctoral study programme is delivered.	<p>Improvements are necessary</p> <p>Even though the Expert Panel recognizes efforts to increase national and international visibility, the Computer Science Department of the HEI has only small visibility outside of Croatia. Even though the number of publications on international level has increased in 2019, the overall number of high-quality publications from 2014 to 2019 is small. This is reflected in the low participation of the HEI research in organizing and programme committees of international top conferences. The Expert Panel met a number of enthusiastic and dedicated researchers and sees a lot of potential for increasing the reputation of the HEI. An incentive system for research, e.g., reduced teaching load for the preparation of project proposals or outstanding publications, might be a way to foster high-quality research.</p>
1.2. The number and workload of teachers involved in the study programme ensure quality doctoral education.	<p>High level of quality</p> <p>The HEI has a mechanism for ensuring quality education; Faculty’s full-time instructors administer 75% of coursework.</p>
1.3. The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.	<p>High level of quality</p> <p>The minimal requirement of two or more publications in the relevant research areas is fulfilled. The Expert Panel recognized efforts of researchers and HEI to increase the number of high-level publications. The Panel encourages researchers and HEI to pursue these efforts.</p>
1.4. The number of supervisors and their qualifications provide for quality in producing the doctoral thesis.	<p>High level of quality</p> <p>The HEI’s supervisor : candidate ratio is 1:1.75, which satisfies the suggested threshold of 1:3. As indicated in the Self-evaluation report, all supervisors of PhD candidates have at least two publications in the last 5 years in their respective research areas.</p>
1.5. The HEI has developed methods of assessing the qualifications and	<p>High level of quality</p> <p>The HEI has developed methods for assessing the</p>

competencies of teachers and supervisors.	qualifications and competences of teachers and supervisors. PhD supervisors have to fulfil the following requirements: (1) at least two publications indexed in CC-, SCI, or SCI-Expanded in the past 5 years, (2) experience in the lead of research projects (or equivalent experience), and (3) additional training for supervisors (or sufficient experience in the past). The HEI management and PhD supervisors acknowledged enforcement of these regulations during the site visit.
1.6. The HEI has access to high-quality resources for research, as required by the programme discipline.	Improvements are necessary The HEI provides very good access to state-of-the-art laboratory equipment and can offer enough workplaces for PhD students. The PhD students are very satisfied with their work environment. However, it was also mentioned that the wide access to online journal databases remains a problem. The Expert Panel acknowledges that this is not a consequence of the HEI's management, but a common problem of universities in Croatia.
2. INTERNAL QUALITY ASSURANCE OF THE PROGRAMME	
2.1. The HEI has established and accepted effective procedures for proposing, approving and delivering doctoral education. The procedures include identification of scientific/ artistic, cultural, social and economic needs.	High level of quality The SER sufficiently elaborated on the scientific, economic and strategic needs for launching the postgraduate study programme in Computer Science, which started in academic year 2018/2019. There currently are established regulations on launching, approving and delivering doctoral education. No doctoral student has graduated yet in the programme under review. The description of the programme includes the necessary justification, and an adequate analysis of social, academic, economic or other needs of the region.
2.2. The programme is aligned with the HEI research mission and vision, i.e. research strategy.	High level of quality Based on Appendix D and Appendix E, as well as the onsite visit of the Expert Panel, the programme is considered to be aligned with a quality research strategy, as well as the HEI Development Strategy. The research foundations of the doctoral programme are of sufficient quality and in line with the Research Strategy. Despite the short history of the programme, its content, selection of the candidates and supervisors have established processes.
2.3. The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.	High level of quality Mechanisms for periodically reviewing and improving the quality of the doctoral programme have been established. These mechanisms include:

	<ul style="list-style-type: none"> - Yearly report and evaluation of the candidates and their supervisors. - Concrete yearly goals for each doctoral candidate. <p>In addition, there is an awareness for following up potential drop-outs and the alumni, however, it's too early for such routines to be activated (e.g., no drop-out and graduate of the programme yet).</p>
2.4. HEI continuously monitors supervisors' performance and has mechanisms for evaluating supervisors, and, if necessary, changing them and mediating between the supervisors and the candidates.	<p>High level of quality</p> <p>The programme describes a mandatory evaluation of supervisors (by the candidates) and the process for resolving potential conflicts between the supervisor and the candidate, as well as changing the supervisor.</p> <p>The quality of supervision was discussed, taking into consideration the candidates' research performance; however, due to the fact that the programme has just started, the Expert Panel couldn't properly evaluate the quality of current and former candidates and the completion rates. In addition, the practices of changing supervisors and mediating in case of problems between a supervisor and a candidate are in place, but haven't been needed yet. Thus, potential adjustments might be required.</p> <p>Notwithstanding this, the Panel recommends a more formal and independent conflict resolution committee be established guaranteeing confidentiality and impartiality in all situations. The current process involves <i>de facto</i> members of the management (Dean or Department Head, for instance) making it unsuited for handling cases involving those members (<i>cf.</i> also item 3.9).</p>
2.5. HEI assures academic integrity and freedom.	<p>High level of quality</p> <p>Procedures that assure academic integrity and freedom of research are in place.</p>
2.6. The process of developing and defending the thesis proposal is transparent and objective, and includes a public presentation.	<p>High level of quality</p> <p>The procedures of producing and defending the doctoral thesis proposal are well described. The Programme explicitly indicates that at least one member of the evaluation committee must be from an institution that is not part of the University of Rijeka. It is advisable, however, to attempt to engage more international experts in the evaluation committee.</p> <p>The proposal defence protocol and respective routines</p>

	<p>have been created. However, due to the fact that the study programme started one year ago, the Expert Panel couldn't assess five theses proposals and their assessment templates from the past five years, which should be attached to the SER.</p>
<p>2.7. Thesis assessment results from a scientifically sound assessment of an independent committee.</p>	<p>Improvements are necessary</p> <p>The HEI has established the procedures of developing and defending the doctoral thesis. The description explicitly indicates that one member of the evaluation committee needs to be from a university outside the University of Rijeka; however, this alone doesn't necessarily encourage the participation of international examiners in the thesis defence committee. It is highly recommended to encourage candidates to write their doctoral thesis in English, and engage international examiners. In case this is not possible, the Faculty can engage professors proficient in Croatian who hold positions in universities outside Croatia.</p> <p>The candidates should have at least one foreign journal publication (or two Croatian journal publications) in the field of Engineering Sciences that is indexed in Current Contents, Science Citation Index, or Science Citation Index Expanded. This measure is in the right direction, however, we recommend that the candidate should have at least one publication with an internationally competitive peer-review venue and avoid the trade-off with two Croatian journals.</p> <p>The programme accepts a variety of formats for the theses (Scandinavian collection thesis and more traditional monograph thesis), however, no theses have been submitted yet and the Expert Panel couldn't review how such formats eventually materialize.</p> <p>Thesis assessment procedures, routines and guidelines are adequately specified.</p> <p>Due to the fact that the study programme started one year ago, the Expert Panel couldn't assess five theses and their defence records from the past five years.</p>
<p>2.8. The HEI publishes all necessary information on the study programme, admissions, delivery and conditions for progression and completion, in accessible outlets and media.</p>	<p>High level of quality</p> <p>Necessary information regarding the study programme, admissions, delivery, conditions for progression, completion and call for applications are accessible via the Faculty and Department's website. In addition, the call for applications is also disseminated in the printed press and</p>

	<p>on international fora.</p> <p>During the site visit, the doctoral students indicated that all the necessary information was accessible to them.</p>
<p>2.9. Funds collected for the needs of doctoral education are distributed transparently and in a way that ensures sustainability and further development of doctoral education (ensures that candidates' research is carried out and supported, so that doctoral education can be completed successfully).</p>	<p>Improvements are necessary</p> <p>Tuition fees are spent on ensuring the further development of the doctoral programme (e.g. equipment, visiting lectures, and conferences).</p> <p>The doctoral candidates also indicated that there is adequate support in equipment and travel to scientific conferences and winter/summer schools.</p> <p>However, the Faculty needs to intensify its efforts to obtain funding from the industry, as well as through regional, national and international opportunities. Such initiatives are currently very low, and those sources of income and engagements will secure important funding for the candidates, as well as engage them in international research.</p>
<p>2.10. Tuition fees are determined on the basis of transparent criteria (and real costs of studying).</p>	<p>High level of quality</p> <p>Tuition fees have been specified (HRK 7500 per year). The programme has avoided front-loading expenses (e.g. fees for the evaluation and defence of the doctoral thesis are covered at the very end), in order to avoid potential drop-outs.</p> <p>The tuition fee has been determined based on the various costs (e.g., equipment, visiting lectures). The doctoral candidates indicated that the information about the tuition fee was clear from the very beginning and affordable.</p>
<p>3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION</p>	
<p>3.1. The HEI establishes admission quotas with respect to its teaching and supervision capacities.</p>	<p>High level of quality</p> <p>Given the fact the programme only started recently, it hasn't had the opportunity nor needs to enforce quotas effectively. Although rules are in place to select and evaluate candidates, the current situation is that of a de facto systematic admission policy.</p> <p>As mentioned above that the PhD programme is a relatively new programme, which is why the University seems to struggle in attracting new PhD students to apply for the</p>

	<p>PhD programme. Last academic year, there were 7 PhD students. This academic year 6 students applied for the PhD programme, and all of them got admitted. Some supervisors have more workload and students; therefore, workload related matters need attention.</p> <p>It is worth mentioning that there are criteria, <i>i.e.</i> the established admission quotas with respect to its supervision capacities, in place. However, as mentioned above, given the programme is new, it is too soon to see whether the established quotas are effective.</p> <p>In addition to that, the Expert Panel also encourages the Department to take the necessary step towards attracting and hiring renowned professors and researchers in the area of Computer Science having a proven track record of acquiring national or international funding so that they can open funded PhD positions.</p>
3.2. The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs.	<p>High level of quality</p> <p>Some of the doctoral students are working full-time in the industry. As mentioned above, the doctoral programme has recently started, and no PhD student has graduated yet. The PhD programme needs time to mature.</p>
3.3. The HEI establishes the admission quotas taking into account the funding available to the candidates, that is, on the basis of the absorption potentials of research projects or other sources of funding.	<p>High level of quality</p> <p>The Expert Panel met with six PhD students. Their research was funded by:</p> <ul style="list-style-type: none"> - the Croatian Science Foundation, or - the University through employment as teaching or research assistants. <p>The Expert Panel did not have the opportunity to interact with self-funded PhD students.</p> <p>The Expert Panel advises that the Faculty or Department opens scholarships/funded PhD positions to attract talented local and international students.</p>
3.4. The HEI should pay attention to the number of candidates admitted as to provide each with an advisor (a potential supervisor). From the point of admission to the end of doctoral education, efforts are invested so that each candidate has a sustainable research plan and is able to complete doctoral research successfully.	<p>Improvements are necessary</p> <p>A supervisor is assigned to every PhD student when they start their studies. The PhD students also have the flexibility to change supervisors if there is a valid reason.</p> <p>Student and supervisors submit a progress report each year. The research question of the PhD students is formally defined only at the end of the second year of the doctoral study programme. Before the second year of studies, a</p>

	<p>generic theme of research is defined.</p> <p>The Expert Panel advises the Department to establish means for PhD students to define a research question earlier in their three years of studies. This will allow them to more efficiently leverage and select available elective courses and study topics, for instance.</p>
3.5. The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.	<p>Improvements are necessary</p> <p>The programme lacks international students. There is a need to open scholarships and funded PhD positions to attract talented local as well as international students.</p> <p>The Expert Panel advises the Department and potential advisors to actively advertise open PhD positions on fora with high international visibility.</p>
3.6. The selection process is public and based on choosing the best applicants.	<p>High level of quality</p> <p>Given that the PhD programme only started recently, the number of applications for admission is still relatively low. All candidates who have applied in the considered academic years have been accepted to start their PhD studies. The selection list is also made public.</p>
3.7. The HEI ensures that the selection procedure is transparent and in line with published criteria, and that there is a transparent complaints procedure.	<p>High level of quality</p> <p>The selection process is well documented and subsequently, once the selection process is completed, the list of selected candidates is made public. As all of the students who applied in the current academic year were selected, there were no complaints about the selection process.</p>
3.8. There is a possibility to recognize applicants' and candidates' prior learning.	<p>High level of quality</p> <p>The Faculty and Department have an established process for recognising students' prior coursework. Students can request to have prior credits in another PhD programme of the HEI or at a different institution taken into account and transferred.</p>
3.9. Candidates' rights and obligations are defined in relevant HEI regulations and a contract on studying that provides for a high level of supervisory and institutional support to the candidates.	<p>Improvements are necessary</p> <p>The activities carried out during the course of studies are well documented. Rights and obligations between PhD students and their supervisors are well documented and there are procedures for conflict resolution.</p> <p>Notwithstanding, the Expert Panel recommends a more formal and independent conflict resolution committee be established guaranteeing confidentiality and impartiality in all situations.</p>

<p>3.10. There are institutional support mechanisms for candidates' successful progression.</p>	<p>Improvements are necessary</p> <p>The Expert Panel believes that the PhD programme at Rijeka has a high potential, but observes that most of the research is published in lesser renowned/established conferences and journals. Therefore, the Expert Panel advises that the researchers (including supervisors and PhD students) start targeting to publish in journals with high impact factor and tier 1 or tier 2 (highly ranked) conferences in their respective domains. This will help in increasing the quality of research as well as increasing the reputation of the Faculty.</p> <p>Concerning a PhD student's research topics, the Expert Panel also advises that a research question must be defined in the first year for each PhD student.</p> <p>The Expert Panel felt that the Faculty should take steps to encourage the students to also publish in highly ranked conferences and journals.</p> <p>Currently, the financial support required for PhD students to present papers at conferences or publish papers in journals is provided by the supervisors through their available funding.</p>
<p>4. PROGRAMME AND OUTCOMES</p>	
<p>4.1. The content and quality of the doctoral programme are aligned with internationally recognized standards.</p>	<p>High level of quality</p> <p>The Expert Panel found that the content and structure of the PhD programme are aligned with international standards. As there are no graduates yet, it is too early to assess whether the Programme is producing theses of an internationally recognised standard. Interdisciplinarity naturally varies from project to project, but an example of successful research involving medical imaging through an international collaboration with Graz, Austria, was presented to the Expert Panel.</p> <p>During discussion with the candidates, the Expert Panel observed that the supervisors are closely and actively working with the students, in many cases meeting daily. The Expert Panel recommends that there be a designated weekly time for a more formal supervisory meeting, because the commitment to such meetings can help to maintain the student's engagement during periods when research is not going so smoothly.</p>

	<p>The Expert Panel noted that there is a limited amount of previous supervisory experience in the department, which is inevitable given that the Programme is new and the Department as a whole does not have a long history. The Expert Panel recommends that supervisors take maximum advantage of any support that is offered at the Faculty level. An idea worth considering would be to arrange mentoring of inexperienced supervisors by experienced supervisors from other departments in the Faculty, or by experienced colleagues from collaborating international institutions.</p>
4.2. Programme learning outcomes, as well as the learning outcomes of modules and subject units, are aligned with the level 8.2 of the CroQF. They clearly describe the competencies the candidates will develop during the doctoral programme, including the ethical requirements of doing research.	<p>High level of quality</p> <p>The learning outcomes of the programme and of the individual modules are documented thoroughly and they are at the right level. The compulsory module on research methodology is a good feature of the programme. As there are not yet any graduates from the Programme, the Expert Panel was not able to check whether the general research competencies have been acquired by the candidates.</p>
4.3. Programme learning outcomes are logically and clearly connected with teaching contents, as well as the contents included in supervision and research.	<p>High level of quality</p> <p>The SER includes thorough documentation.</p>
4.4. The doctoral programme ensures the achievement of learning outcomes and competencies aligned with the level 8.2 of the CroQF.	<p>Improvements are necessary</p> <p>As there are not yet any graduates from the programme, the Expert Panel was not able to check that the theses are of the expected quality. The Expert Panel checked the published papers that were submitted, and they are of a high standard of presentation. The sample was necessarily limited, because most of the currently enrolled candidates have only completed one year of the programme and it is too early to expect them to have produced publications. There are candidates in more advanced years of study, who have transferred from Electronic Engineering, and their publications were submitted. The Expert Panel noted that most of the submitted publications were from the local MIPRO conference rather than internationally recognised venues. We have recommended elsewhere (section 3.10) that candidates and supervisors should be encouraged to submit to the leading international conferences.</p>
4.5. Teaching methods (and ECTS, if applicable) are appropriate for level 8.2 of the CroQF and assure achievement of	<p>High level of quality</p> <p>The course on research methodology is delivered <i>ex-cathedra</i>, as are some of the specialised courses. Some</p>

clearly defined learning outcomes.	<p>courses are delivered by instructors from other institutions, including international ones. In the latter cases, the students receive individually tailored instruction as part of their visits (which are required as part of the programme) to external institutions. This can be an effective way of giving students access to specialised material when it might not be feasible to run a traditional lecture course. However, it is difficult to control and monitor the amount of instruction received, and learning achieved, in relation to the number of credits.</p>
4.6. The programme enables acquisition of general (transferable) skills.	<p>High level of quality</p> <p>Many general skills are covered by the research methodology course, which is compulsory. Other general skills can be acquired by a range of activities that are built in to the programme: giving presentations of research in internal seminars, writing annual research plans, participating in My First Conference, visiting international institutions, presenting research at international conferences. Credit is assigned to all of these activities.</p>
4.7. Teaching content is adapted to the needs of current and future research and candidates' training (individual course plans, generic skills etc.).	<p>Improvements are necessary</p> <p>The visits by the candidates to other institutions, which are a compulsory part of the programme, are planned on the basis of relevance to the individual research plans. Candidates can also choose from a range of optional courses, according to their relevance.</p> <p>The Expert Panel was not able to assess individual annual research plans. These should be made available for re-accreditation in future.</p>
4.8. The programme ensures quality through international connections and teacher and candidate mobility.	<p>High level of quality</p> <p>The requirement for candidates to spend periods visiting other institutions is a very good feature of the programme. Not all of the candidates have completed visits yet, because most of them have only completed one year of study. However, during the discussion with the candidates, the Expert Panel was told about successful visits to Ljubljana and Graz. It is clear that these visits are extremely beneficial to the candidates.</p> <p>The range of institutions with which Erasmus and other agreements exist, enabling potential visits in the future, is impressive. The Expert Panel was also impressed by the number of instructors at other institutions who are willing to receive visits from candidates and give them individual</p>

	<p>project-based tuition. The availability of Erasmus funding for outward visits by candidates is of great benefit to the programme.</p> <p>Encouraging incoming visits by researchers within Erasmus would be a good idea, and would potentially benefit larger groups of students and Faculty members simultaneously.</p> <p>Candidates are encouraged to publish papers at international conferences, and receive credit for doing so. The Expert Panel was pleased to find that funding is available for attending such conferences. The Expert Panel has noted elsewhere that attention should be given to the choice of conferences, in order to aim for the publication of research results at the most visible and high-impact venues.</p> <p>The Panel already noted (section 2.7) that candidates should be encouraged to write theses in English, to increase the international visibility of their work and to make it possible for international examiners to be included in thesis committees. The choice of external examiners can be highly significant for a candidate and can often become an important professional relationship. It therefore is beneficial for examiners to come from leading international centres.</p>
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*** NOTE: RECOMMENDATIONS OF THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL AND QUALITY LABEL**

The role of the Expert Panel in the re-accreditation of doctoral study programmes is manifold. The Expert Panel or part of the Expert Panel visiting a higher education institution drafts a report on the basis of a self-evaluation report, the accompanying relevant documentation, and a site visit to HEI. The draft report is adopted by all members of the Cluster Expert Panel, while the president of the Cluster Expert Panel is responsible for coordinating the assessment levels.

The report contains an assessment on whether a doctoral study programme delivered at a higher education institution complies with the prescribed laws and by-laws, as well as any additional/recommended requirements defined by the Agency's Accreditation Council, and whether a higher education institution can obtain a positive, i.e. satisfactory quality assessment according to the criteria set out in this document. Moreover, the Expert Panel must make recommendations for quality improvement.

Based on the assessment of all these elements, the Expert Panel may propose to the Accreditation Council of the Agency to issue either a confirmation on compliance, a letter of expectation for the period up to three (3) years in which period the higher education institution should eliminate the identified deficiencies, or to deny the license.

If the Expert Panel has assessed that a doctoral study programme delivered by a higher education institution does not meet legal and other requirements or that the quality of a study programme is not ensured (i.e. that HEI does not meet additional requirements or recommendations made by the Accreditation Council, or has a very poor quality assessment), they should propose to the Accreditation Council to deny the license.

If the Expert Panel considers that the relevant laws and bylaws have been met by a higher education institution, but that certain elements mentioned above do not meet the quality requirements, while they consider that the identified shortcomings can be corrected within a time frame of three years, they should issue a letter of expectation.

If the Expert Panel considers that all legal and additional/recommended requirements have been met and the quality assessment is satisfactory, i.e. that a study programme fulfils the learning outcomes appropriately defined for that level and scientific area, they may propose the issuance of a certificate and have a HEI commit to quality improvement and reporting to the Agency during the follow-up period.

Finally, if the Expert Panel has, in accordance with the criteria mentioned above, proposed issuing the certificate of compliance and assessed that, in addition to meeting the minimum quality requirements – i.e. the qualification framework level - for a study programme, the programme should be identified as a doctoral programme of a 'high level of quality', the Expert Panel may propose to the Agency's Accreditation Council that such a doctoral study programme be awarded the 'high quality label'. Thus the Agency, with the consent of the Accreditation Council, grants a higher education institution the right to use the label for their academic and promotional purposes.

The 'high quality label' cannot be proposed or awarded to a programme or a higher education institution that does not comply with the requirements laid down by the laws and bylaws mentioned

in this document, and any additional requirements recommended by the Accreditation Council. Moreover, the quality assessment awarded to a study programme should reflect a high level of quality inasmuch that at least half of the sub-criteria in each of the quality assessment criteria are assessed as being of high quality. The Accreditation Council of the Agency issues a final opinion on the label awarded. The content and form of the quality labels shall be prescribed by the Agency in a relevant general act.

The Accreditation Council of the Agency discusses the final report with all recommendations and suggestions, and issues their opinion on the report. Based on a prior opinion of the Accreditation Council, the Agency issues an Accreditation Recommendation to the minister responsible for science and higher education, and upon receipt of the minister's final decision on the outcome of the procedure, awards the 'high quality label' to a higher education institution.