



**Report  
of the Expert Panel  
on the REACCREDITATION  
of the University Postgraduate (Doctoral) Programme**

***Food Engineering***

**Faculty of Food Technology of the Josip Juraj Strossmayer University  
of Osijek**

**Date of the visit:**  
*June 7<sup>th</sup>, 2016*

October, 2016

**CONTENTS**

INTRODUCTION.....3

SHORT DESCRIPTION OF THE STUDY PROGRAMME.....5

RECOMMENDATION BY THE EXPERT PANEL TO THE ASHE'S ACCREDITATION COUNCIL .....7

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME.....7

ADVANTAGES OF THE STUDY PROGRAMME .....8

DISADVANTAGES OF THE STUDY PROGRAMME.....8

EXAMPLES OF GOOD PRACTICE.....8

COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME.....9

QUALITY ASSESSMENT ..... 11

## **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 *Food Engineering* on the basis of the Self-Evaluation Report of the programme, other documentation submitted and a visit to the Faculty of Food Technology of the Josip Juraj Strossmayer University of Osijek.

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.

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 for the Cluster of Biotechnology:

- Professor Hans Thordal-Christensen, Department of Plant and Environmental Sciences, University of Copenhagen, Kingdom of Denmark, President of the Expert Panel
- Dr. sc. Vesna Miličič, Biotehnoška fakulteta, Univerza v Ljubljani, Republic of Slovenia
- Professor Marketta Sipi, Faculty of Agriculture and Forestry, University of Helsinki, Republic of Finland
- Professor Jürgen Pretzsch, Dresden University of Technology, Federal Republic of Germany
- Professor Claes Niklasson, Chalmers University of Technology, Sweden
- Dr Colette Fagan, University of Reading, United Kingdom
- Professor Susanne Knøchel, Faculty of Science, University of Copenhagen, Denmark
- Hynek Roubík, doctoral candidate, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Czech Republic
- Prateek Mahalwar, doctoral candidate, Max Planck Institute for Developmental Biology, Tuebingen, Federal Republic of Germany

- M. Sc. Kathirvel Alagesan, doctoral candidate, Max Planck Institute of Colloids and Interfaces, Federal Republic of Germany.

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

- Professor Susanne Knøchel, Faculty of Science University of Copenhagen, Denmark
- Professor Claes Niklasson, Chalmers University of Technology, Sweden
- dr. Colette Fagan, University of Reading, United Kingdom
- M. Sc. Kathirvel Alagesan, doctoral candidate, Max Planck Institute of Colloids and Interfaces, Federal Republic of Germany.

In the analysis of the documentation, site visit and writing of the report the Panel was supported by:

- Frano Pavić, coordinator, ASHE
- Lida Lamza, interpreter at the site visit and translator of the Report, ASHE.

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

- Management (Dean, Vice Deans)
- Head of PhD programme
- Doctoral candidates
- Supervisors
- Alumni and External stakeholders,

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

## ***SHORT DESCRIPTION OF THE STUDY PROGRAMME***

Name of the study programme contained in the licence: Postgraduate (Doctoral) Programme  
*Food Engineering*

Institution providing the programme: Josip Juraj Strossmayer University of Osijek

Education provider(s): Faculty of Food Technology of the Josip Juraj Strossmayer University of Osijek

Place of delivery: Osijek, Franje Kuhača Street 20

Scientific area and field: Biotechnical sciences, Food technology

Learning outcomes of the study programme:

- PhD graduate within the program are qualified to create, evaluate and analyse research and projects in the field of food engineering and to develop new and improve existing products and technologies.
- The knowledge obtained over the course of the study allows the candidates to continue to advance professionally, develop new ideas and take on managerial positions in scientific and manufacturing organizations.

Number of doctoral candidates: 50

Number of teachers: 25

Number of supervisors: 31

## ***SHORT SUMMARY OF THE EVALUATION***

The Expert panel visited the Faculty of Food Technology for a full day the 7<sup>th</sup> June 2016 and had time to talk to the management, head of PhD programme, students and supervisors/mentors within the programme, and alumni. All members of the Expert Panel also read carefully all the documents provided by the Croatian Agency for Science and Higher Education. Overall, the impression of the PhD programme is very positive: the supervisors are supporting/supervising the PhD students with great enthusiasm and on a nearly daily basis within the programme. There is also high, but somewhat varying competencies in relevant and important research areas.

The research must be considered to be more applied than in many European universities of high quality. This will have a natural impact on the journals the supervisors and candidates choose to publish their research in. In this context, the Expert Panel observed that all sections of the faculty had an ambition to improve this important quality metric. The supervisors (as well as students) are to a large extent of high quality in terms of publications within their applied area of research.

The facilities are generally of good quality, but some will require upgrading or replacement in the near future. The recommendations suggested by the Panel are our sincere thoughts, and

should be considered within the constraints that the Faculty operates under due to many existing regulations and laws in Croatia.

The PhD programme receives applicants that would be considered between good and excellent in a European context. The programme is generally organised in a very good, clear and transparent manner. The defence of the research areas (performed early in the programme) in particular must be considered as a high quality aspect of the programme. However, the structure and external assessment procedure for the defence of the final thesis can be improved.

The existing cooperation with industry and external institutes should be further supported. It provides the opportunity for researchers to access more sophisticated experimental equipment and also facilitates the development of potential future international collaborations within the EU.

Overall we see the PhD programme as a very ambitious and successful programme, and while there may be challenges, there are also opportunities to develop the programme in a positive way. This relies on management and faculty to continue their strong efforts to internationalise and improve quality in accordance with the suggested improvement areas and strategies from the Panel.

## ***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 confirmation on compliance for performing parts of activities.**

## ***RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME***

### 1. Internationalisation:

- Increase the number and quality of publications in international peer reviewed journals.
- Create stronger incentives for mentors to take part in international secondments and collaborations.
- Increase the number of international students and mentors.
- Create a more international study environment, for example by having the administrative procedures for research topic selection (and other documentations) and defence more internationally transparent through the use of English to widen the opportunity for participation of the international research community.
- Reduce barriers and create further opportunities for PhD students and postdoctoral researcher studying and working abroad to be reintegrated back into Croatian universities.

### 2. Quality assurance:

- Create stricter regulations to ensure that the external members of committees for PhD thesis defence are independent of the mentor and candidate (not current collaborators), and that the majority of them come from outside the University.
- Create, if possible, the opportunity for greater flexibility in determining the workload of mentors between teaching, research and other duties.
- Strive for higher quality of the theses in terms of published papers in international peer reviewed journals. These should also be included in the theses.

### 3. Course content

- Strive for more courses taught in English, and more opportunities to write in English through reports etc.
- Research ethics and IPR should be included in the compulsory courses or added as workshops or training sections early in the programme, for example in the introductory course.

## ***ADVANTAGES OF THE STUDY PROGRAMME***

1. A very close cooperation between candidates and supervisors results in excellent team work, with a strong emphasis on building individual competence.
2. Strong support from Faculty management and the head of PhD programme.
3. A clear contract (expectations, obligations for every part) on what is required from each partner, i.e. faculty, head of programme, management, and candidates.
4. Recruitment of good students locally.

## ***DISADVANTAGES OF THE STUDY PROGRAMME***

1. Limited opportunities for international collaboration, including broader recruitment of international students and teachers.
2. Limited scope and delayed access to international journals through available library resources.
3. Some laboratory equipment requires upgrading or replacing.
4. Lack of training in soft and transferrable skills (such as research ethics and IPR).

## ***EXAMPLES OF GOOD PRACTICE***

1. Transparent application procedure and PhD programme assessment right from admission to defence.
2. Transparent, easily accessible and detailed information about the list of instruments available within the Faculty and responsible person.
3. Very positive and friendly high quality faculty members with easy access through open door and day to day supervision.
4. The possibility to use other lab facilities within the Faculty, industry and University.
5. Strong cooperation with local industry on projects and candidate recruitment.

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

<b>Minimal legal conditions:</b>	<b>YES/NO notes</b>
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.	<b>YES</b>
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).	<b>YES</b>
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).	<b>YES</b>
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).	<b>YES</b>
5. Student: teacher ratio at the HEI is below 30:1.	<b>YES</b>
6. HEI ensures that doctoral theses are public.	<b>YES</b>
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.	<b>YES</b>
<b>Additional/ recommended conditions of the ASHE Accreditation Council for passing a positive opinion</b>	<b>YES/NO notes</b>
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.	<b>YES</b>
2. In the most recent reaccreditation, HEI had the standard Scientific and Professional Activity marked as at least "partly implemented" (3).	<b>YES</b>
3. The doctoral programme is aligned with the HEI's research strategy.	<b>YES</b>
4. The candidate: supervisor ratio at the HEI is not above 3:1.	<b>YES</b>
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 the past five years (table 2, Supervisors and candidates); c) confirms feasibility of the draft research plan upon admission of the candidate (or submission of the proposal); 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,	<b>YES</b>

<p>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>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>	<b>YES</b>
<p>7. The supervisor normally does not participate in the assessment committees.</p>	<b>YES</b>
<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>	<b>YES</b>
<p>9. For joint programmes and doctoral schools (at the university level):</p> <p>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>	<b>N.A.</b>

## QUALITY ASSESSMENT

<b>1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE</b>	<b>QUALITY ASSESSMENT AND THE EXPLANATION OF THE EXPERT PANEL</b>
<p>1.1 HEI is distinguished by its scientific/ artistic achievements in the discipline in which the doctoral study programme is delivered.</p>	<p><b>Improvements are necessary</b></p> <p>HEI is considered as adequate with good quality in general, and with parts that are stronger than others considering the PhD program. The program can be improved by increasing the internationalisation aspects, publication quality and visibility in the European research society.</p>
<p>1.2 The number and workload of teachers involved in the study programme ensure quality doctoral education.</p>	<p><b>High quality</b></p> <p>The number and workload of supervisors and faculty members are reasonable to ensure quality of the doctoral programme, and much more than 50% of the courses are delivered by the faculty. The possibility of excellent researchers within the programme to focus more on research, and vice versa for the excellent teachers, should be supported (greater flexibility would be beneficial for the PhD programme).</p>
<p>1.3 The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.</p>	<p><b>Improvements are necessary</b></p> <p>The Faculty has a sufficiently high number of supervisors who meet the stated requirements of &gt;3 publications in 5 years. The staff seemed very dedicated and engaged in supervision. The publication rate has been increasing, and several papers are published in internationally recognized journals. It would, however, be advantageous to strive for an increased number of publications in higher impact international journals in order to raise the international profile.</p>
<p>1.4 The number of supervisors and their qualifications provide for quality in producing the doctoral thesis.</p>	<p><b>High quality</b></p> <p>The PhD programme is of high quality. The ratio of candidate: supervisor is in compliance with the Criteria for the assessment of quality of HEIs. The Expert Panel observed very energetic, professional, friendly, easily accessible faculty members who provide almost day-to-day supervision. Publication track record of faculty members is satisfactory. Expert Panel recommends striving for consortium-</p>

	led initiatives with other European universities and research institutes to attract more EU funding (also for internationalisation).
1.5 The HEI has developed methods of assessing the qualifications and competencies of teachers and supervisors.	<p><b>High quality</b></p> <p>Students provide anonymous feedback about each course and quality of teaching and mentoring provided by the faculty. PhD supervisors submit annual progress reports to both Faculty Council and the University, and their feedbacks are obtained and assessed.</p>
1.6 The HEI has access to high-quality resources for research, as required by the programme discipline.	<p><b>Improvements are necessary</b></p> <p>The candidates have access to reasonable/adequate research infrastructure in terms of equipment. Some of the more advanced equipment facilities are very booked, while others must be considered fairly old with challenges in terms of lack of spare parts and maintenance capacity. There were several examples of the staff being inventive and designing their own specialised equipment. The students have access to good facilities within the library and databases provided by the Ministry. However, we recommend that the Ministry ensures access to all relevant scientific journals, including their recently published/current issues. We also recommend that there is an overall strategy for getting state-of-the-art equipment in areas of vital interest for the research programme.</p>
<b>2. INTERNAL QUALITY ASSURANCE OF THE PROGRAMME</b>	
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.	<p><b>High quality</b></p> <p>The management informed the Panel that, as part of the University approval process, the Faculty carries out a feasibility study prior to the start of a programme. The programme will not be authorised unless it meets scientific, social and economic needs. Provided documents shows clearly that this requirement is fulfilled.</p> <p>The primary basis for the programme in Food Engineering was stated to be the requirements of the local food industry. It was stated that the local food industry needed to up-skill its workforce to ensure</p>

	that it has the capacity to modernize.
2.2 The programme is aligned with the HEI research mission and vision, i.e. research strategy.	<p><b>High quality</b></p> <p>The Faculty conducts mainly applied research as driven by the needs of the food industry. Research is focused around strategy developed within and aligned with the research mission of the HEI.</p> <p>Historically, 50% of the students within the programme come from industry. In this case, a student (and company) probably prefers to choose a project of benefit to themselves and their company or institute.</p>
2.3 The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.	<p><b>High quality</b></p> <p>HEI monitors candidate's progress with periodic reviews and follow up processes within 6 years (Teaching Assistant) or 10 years (industry-funded). Improvements are implemented when needed and with short notices.</p> <p>The management clearly stated that if a problem with student progress is identified, the head of programme and/or other faculty members will discuss this with the student and identify ways to assist. However no formal procedure is in place since no case in history has been documented.</p> <p>The Faculty/management/head of PhD programme has in place a process for monitoring student progress and mentor activity through:</p> <ul style="list-style-type: none"> <li>• yearly project reports,</li> <li>• yearly dean's reports,</li> <li>• applications and approvals of new projects, and</li> <li>• yearly activity reports and reports from doctoral candidates, assistants, postdoctoral candidates and mentors.</li> </ul> <p>There was no documentation on formal system for collecting and analysing feedback from alumni or employers.</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><b>High quality</b></p> <p>The candidates' research performance is reasonable. Performance may vary according to the group of student (TA versus industry funded), but student must publish at least one paper in a peer-reviewed</p>

	<p>journal.</p> <p>Feedback from current and former candidates is very positive. They all reported that they had adequate supervision and that mentors often went out of their way to help them. They also stated the faculty were very open, which promotes a supportive environment.</p> <p>Completion rates – no drop-outs were reported.</p> <p>Current students were aware that they had the right to request a change of topic and/or supervisor. They stated the procedure for this and felt all information was available on-line if it was needed.</p> <p>Documents, procedures and practices of awarding successful supervisors – the Faculty ranks mentors on their successes, and each year the top academics are awarded some additional support, etc.</p> <p>The supervisors are evaluated yearly in terms of supervision, publications and other indicators.</p>
<p>2.5 HEI assures academic integrity and freedom.</p>	<p><b>High quality</b></p> <p>From the SER: ‘The prevention of plagiarism and other unethical behaviour has been further reinforced since September 2014 by introducing the Ephorus anti-plagiarism software at the University level. Ephorus is a program package created for educational institutions with the purpose of checking the originality of the papers, i.e. detect plagiarism’. No supervisor/mentor/researcher identified a lack of academic freedom as a problem. It was confirmed that University Ethical codex (with a focus on chapter IV) is, among other things, associated with plagiarism It should, however, be noted that when theses are written in languages other than English, checking for plagiarism is a difficult issue.</p>
<p>2.6 The process of developing and defending the thesis proposal is transparent and objective, and includes a public presentation.</p>	<p><b>High quality</b></p> <p>The Faculty has procedures in place for approval of the topic of the doctoral thesis. The Faculty forms a committee, although there are no compulsory external members (external to the University). The Panel accepts this as being appropriate and that approval of the topic should be an internal process. The Faculty has published a protocol for defence of the topic, which is summarized in the SER. All</p>

	<p>interviewed students were aware of these procedures, and procedures and forms are available on <a href="http://www.ptfos.unios.hr/index.php/doktorski">http://www.ptfos.unios.hr/index.php/doktorski</a>. The Panel was provided with doctoral theses that have been successfully defended in the last 5 year. The completed and signed forms related to admission, proposal and defence were included.</p>
<p>2.7 Thesis assessment results from a scientifically sound assessment of an independent committee.</p>	<p><b>Improvements are necessary</b></p> <p>The Faculty has a procedure in place for defending the doctoral thesis, which is summarised in the SER. All interviewed students were aware of these procedures, and forms are available on <a href="http://www.ptfos.unios.hr/index.php/doktorski">http://www.ptfos.unios.hr/index.php/doktorski</a>. For defence of the thesis, the Faculty forms a committee with one external member (not always outside the University). Due to language and financial barriers there have been limited opportunities for international members of the committee. The chair of the committee is determined by seniority. The Faculty also provides templates for thesis preparation on the above mentioned website. Candidates are required to have at least one publication in a peer-reviewed journal prior to submitting their thesis. Students did have the opportunity to submit their thesis in different formats, although so far none had taken this opportunity. There are not clear procedures for ensuring that the external committee members for PhD thesis defence are independent of the mentor and candidate. The majority should come outside the University, therefore further external and international input outside University must be supported.</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><b>High quality</b></p> <p>The Faculty publishes all necessary information on the study programme, admissions, delivery and conditions for progression and completion on its website.</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</p>	<p><b>High quality</b></p> <p>The HEI management described how the external resources were distributed.</p> <p>The SER explains how tuition fees are spent. Where tuition (HRK 60,000.00) is paid:</p> <p>25% (HRK 15,000.00) is for the costs of the</p>

<p>successfully).</p>	<p>application and defence of the doctoral thesis and for the diploma fee and the award of the academic degree Doctor of Science.</p> <p>75% is distributed according to the Faculty Decision CLASS: 035-01/14-03/01, REGISTRY NUMBER: 2158-82-01-14-01 (January 15, 2014).</p> <p>Of the 75% distributed to the faculty:</p> <p>50% is used for the improvement of Faculty activities (i.e. purchasing new research equipment, maintenance of research equipment, covering overhead expenses.)</p> <p>45% for the purposes of study curriculum (to the head of study and the teaching staff) and compensations for the mentors (co-mentors) of the doctoral thesis, and the members of the committees for the assessment/defence of the doctoral thesis.</p> <p>5% to the University Development Fund; pursuant to Article 22 of the Regulation on Financial Activity of the University of Osijek, which complies with the regulations on using own and dedicated funds, i.e. to insure further development of the doctoral programme.</p> <p>Approximately 50% of student enrolled in the last 5 year pay full tuition costs. From the interviewed students it was observed that the majority had or intended to disseminate their results by presenting at international conferences with support from the Faculty.</p>
<p>2.10 Tuition fees are determined on the basis of transparent criteria (and real costs of studying).</p>	<p><b>High quality</b></p> <p>The Faculty management explained to the Panel that they try to balance the competitiveness of the programme against actual costs of studying on the programme. Real costs of studies were described in terms of supervision, bench fees and other costs connected to the studies. Transparent criteria were described by the management.</p>

<p><b>3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION</b></p>	
<p>3.1 The HEI establishes admission quotas with respect to its teaching and supervision capacities.</p>	<p><b>High quality</b></p> <p>The number of available supervisors and their teaching workload is satisfactory.</p> <p>In terms of quality of supervisors and co-supervisors (if a supervisor has been appointed), their competencies are in accordance with the candidates' research proposals and need for guidance.</p> <p>The number of candidates a teacher presently supervises do not exceed 3 candidates per supervisor, as recommended.</p> <p>Teaching workload of supervisors do not exceed the existing legal thresholds as stipulated.</p> <p>The HEI clearly defines the obligations of supervisors and co-supervisors, candidates and research teams.</p>
<p>3.2 The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs.</p>	<p><b>High quality</b></p> <p>When starting up the programme, a planning of the need for different competences and people in the defined branches or sectors was executed.</p> <p>The data for the number of unemployed PhDs was not available at the moment.</p> <p>The graduated PhDs are mainly employed in research and development positions in the public and private sector.</p> <p>Considering the discussion with the alumni and management on site, it was discovered that the graduated PhDs historically do get relevant jobs.</p> <p>The Faculty has a number of research projects with businesses, HEIs and public research institutes, which serve as the basis for a part of the admission quota.</p>
<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>	<p><b>High quality</b></p> <p>The provided funds for candidates' research must be considered as adequate in terms of time for graduation and nature of the project,</p> <p>Faculty members continuously apply for different sources nationally and internationally for external</p>

	<p>funding of projects.</p> <p>European cooperation projects must be considered as a resource for further research cooperation, and be the goal and focus of further work.</p> <p>The number of accepted candidates for the PhD programs seems to be appropriate considering the financial situation at the Faculty.</p>
<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>	<p><b>High quality</b></p> <p>The number of mentors/supervisors compared to the number of candidates is adequate in term of not having more than 3 candidates per mentor. Each candidate is given almost daily supervision according to interviews with students and supervisors. The satisfaction with this arrangement was obvious from all partners. In case of need for co- supervisors, this was handled with external or internal people directly.</p> <p>From the interviews with the different stakeholders, it can be concluded that the HEI assures that from the point of admission to the end of doctoral education, each candidate has a sustainable research plan and is able to complete doctoral research successfully.</p>
<p>3.5 The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.</p>	<p><b>Improvements are necessary</b></p> <p>Interested candidates from abroad are welcome, and the advertisement for new PhD positions are on the web, usually only in Croatian and sometimes in English. Since some parts of the PhD program are only in Croatian (English is possible if needed), it must be concluded that the possibility for recruiting excellent students worldwide will be limited. It must be noted that some PhD students outside Croatia (but still from neighbouring countries) were in the programme. Supervision in English is provided by supervisors/mentors. The main body of the PhD courses are presently only given in Croatian language. The only useful information for future foreign PhD students is feasibility plan which is available on the web site. Link to the English web site: <a href="http://www.ptfos.unios.hr/en/">http://www.ptfos.unios.hr/en/</a>.</p>
<p>3.6 The selection process is public and based on choosing the best applicants.</p>	<p><b>High quality</b></p> <p>The HEI publishes the call for applications in a timely manner. The criteria for selecting the applicants</p>

	<p>includes past performance, demonstrated interest in artistic or scientific research, publications, recommendations by teachers and a prospective supervisor, and a research proposal. The HEI describes the yearly selection through open and written applications with motivation letter, CV's and, maybe most important, the in-depth interviews. According to the students, all were interviewed before entering the program. The average grading (4.2 – 4.4) of the accepted students must be considered high compared to the minimum value of 3.5. Many of the applying students already had experience with working in the labs of interest and had their Master education at the University.</p>
<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>	<p><b>High quality</b></p> <p>The HEI ensures that the selection is clear and that applicants have a right to complain. This was clear from the interviews with the management, candidates and the supervisors.</p> <p>The selection procedure is documented and the list of admitted applicants is public. During the interviews, one student said she applied three times and got feedback each time on how to improve her application and her merits for entering the programme. This seems to be a very professional handling, and proper assessment/feedback was given to the applicants. It was clear that the applicants who were not admitted have the right to review the strengths and weaknesses of their application and, possibly, receive guidelines to improve their research plans.</p>
<p>3.8 There is a possibility to recognize applicants' and candidates' prior learning.</p>	<p><b>High quality</b></p> <p>The HEI must be considered as having a proper quality procedure of recognizing prior learning and achievements relevant for the doctoral programme, e.g. recognition of ECTS from a master's or another doctoral programme, publications etc., as well as non-formal and informal learning.</p>
<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>	<p><b>High quality</b></p> <p>When a candidate enters the PhD programme, a contract is set up considering high level of supervision and institutional support rights for all partners. The HEI has this contract on studying which is signed by</p>

	<p>each candidate. The quality assessment process is satisfactory.</p> <p>Interviews with the students show that this contract process is transparent and that they are satisfied with all aspects of it.</p>
<p>3.10 There are institutional support mechanisms for candidates' successful progression.</p>	<p><b>High quality</b></p> <p>According to interviews and information provided to the Panel, institutional support mechanisms for candidates' successful progression are of high quality.</p> <p>The number of publications exceeds the lower limit of one published paper in a peer-reviewed journal. The variance is quite large with some candidates with at least 3-5 publications. Expert Panel is of the opinion that it would be highly informative to access these criteria if in future; Faculty can provide the candidates/authors contribution to those papers.</p> <p>Institutional support is available for the students to attend international conference. Based on the interviews with students, management and supervisors it could be concluded that each student attended at least one conference (not always outside Croatia). It was also clear that the Faculty encourages candidates to participate in such conference and provides help for candidates to apply for several travel grants. Information regarding various conferences and available support is given transparently on the web and also communicated to the students in person or via email.</p> <p>The majority (more than 50%) of the candidates were supported directly by the institution (TA or science funding). The number of students from external institutions and industry were historically not small (above 25%), but it is decreasing.</p>
<p><b>4. PROGRAMME AND OUTCOMES</b></p>	
<p>4.1 The content and quality of the doctoral programme are aligned with internationally recognized standards.</p>	<p><b>High quality</b></p> <p>The quality is assessed on the basis of the programme as it was delivered to the Panel. The programme is research-oriented and focused on the candidate's independent work (it provides for at least three years of independent research experience, as regulated by the Croatian Qualifications Framework, CroQF).</p>

	<p>Teaching is included as required by the needs of candidate's research (the content can vary) and enables the candidate to acquire generic (transferable) skills and international experience.</p> <p>The HEI adequately explains the methods and procedures of meeting international standards of doctoral education in the relevant discipline by comparing the programme to those of international HEIs in the following features:</p> <p>programme - and programme content - comparability to programmes at international HEIs, i.e. comparability of programme objectives, admission criteria, admission procedures, programme duration, specialisations, volume of teaching and the ratio between teaching and research, number of compulsory and elective courses;</p> <p>comparability of supervision procedures;</p> <p>comparability of thesis formats and assessment committees;</p> <p>comparability with international HEIs in complying with national and international professional standards.</p> <p>The programme provides for interdisciplinary, i.e. provides opportunities to develop and implement interdisciplinary research based on interviews of management and Head of PhD programme.</p>
<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>	<p><b>High quality</b></p> <p>The Expert Panel assesses the quality of intended learning outcomes, especially regarding the teaching component of the programme, e.g. if the learning outcomes lead to the level 8.2 of the CroQF or if they are more appropriate for level 7 or lower. The learning outcomes are well described (course objectives, intended outcomes, content, teaching and learning methods - including independent learning and research) in order to assure and monitor the achievement of intended learning outcomes and candidates' obligations (assessment procedures), successful performance of teachers and supervisors, and quality in general.</p> <p>In addition to research competencies, the programme</p>

	<p>also provides for competencies in research ethics, but this can be strengthened further.</p> <p>The HEI and its programme meet the CroQF level 8.2 by quality descriptors of the programme learning outcomes.</p> <p>The Expert Panel thinks that the following skills and competencies are acquired (according to interviews and documents provided):</p> <p>Specific research competencies (interviews with candidates, programme description and submitted theses demonstrate the quality of acquired research competencies, such as collecting information and sources, critical reading and identifying biases, interviewing skills, construction of measuring instruments etc.);</p> <p>project planning and management competencies;</p> <p>competencies in research methodologies i.e. inference (using relevant hardware and software, statistical analyses, statistical inference, making conclusions based on quantitative data);</p> <p>reading and writing skills (speaking and listening, presenting data and conclusions to non-experts);</p> <p>teaching and assessment skills;</p> <p>competence in demonstrating individual professional and ethical authority;</p> <p>readiness to accept ethical and social responsibility for performing research successfully, delivering socially useful research results as well as potential social impact, readiness to face new social and economic challenges.</p>
<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>	<p><b>High quality</b></p> <p>Interviews with candidates (and alumni) demonstrate that the learning outcomes are logically and clearly aligned with individual courses, supervisory work and research.</p>
<p>4.4 The doctoral programme ensures the achievement of learning outcomes and competencies aligned with the level 8.2 of the CroQF.</p>	<p><b>High quality</b></p> <p>The programme has accurate and transparent procedures for quality assurance. The initial choice of topic has to be defended, progress reports are obligatory, and a pre-approval of the thesis takes</p>

	<p>place before the defence. Until now the mentor has been part of the final evaluation committee, but this has changed from this year.</p> <p>It was not possible for the Panel to assess in full the theses <i>per se</i> since they were all written in Croatian, a fact which also excludes international participation in evaluation committees. Nevertheless, it was evident from the attached publications that some of these had resulted in a highly satisfactory output with several papers in well recognized international journals, while others had a more modest output (one publication in a low impact journal which is the programme's minimal requirement).</p>
<p>4.5 Teaching methods (and ECTS, if applicable) are appropriate for level 8.2 of the CroQF and assure achievement of clearly defined learning outcomes.</p>	<p><b>High quality</b></p> <p>The course work consists currently of three compulsory courses and a number of elective courses (choose 5). Students and alumni expressed satisfaction with the selection of courses and the possibility of having these tailor-made, e.g. in the form of seminars or lectures covering their specific interests. The courses' topics according to the list seem relevant and important.</p>
<p>4.6 The programme enables acquisition of general (transferable) skills.</p>	<p><b>Improvements are necessary</b></p> <p>Generic skills such as scientific writing in English, research ethics, project managerial skills or training in application writing seems to be done as non-formalized "on-the-job" training. It is recognized that the students have very different backgrounds, with some having exclusively university background while many of the externally-funded students have extensive work experience. Their needs may therefore differ, but it is important that all PhD students in general have reflected on science ethics including issues such as plagiarism, fraud and the increasing number of non-serious journals.</p> <p>It is recommended that relevant generic skills are being introduced in some of the introductory courses. An elective course in scientific writing in English could also be available for students drafting their first international paper. These courses could potentially be arranged at the University level or even in collaboration with another university.</p>

<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>	<p><b>High quality</b></p> <p>Elective courses seemed to be flexible and adapted to individual needs (see 4.5).</p>
<p>4.8 The programme ensures quality through international connections and teacher and candidate mobility.</p>	<p><b>Improvements are necessary</b></p> <p>The management actively supports research staff mobility and the students in obtaining international experience within the economic constraints. In recent years, the Erasmus program has enabled many to have stays in other European laboratories, and the projects funded by Croatian Science Foundation often include funding for external visits. The Faculty has had some international collaboration, but there are still highly limited opportunities to attract long term international staff and to have researchers coming for a limited time.</p>

## **\* 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.