



**Report
of the Expert Panel
on the RE-ACCREDITATION
of the University Postgraduate (Doctoral) Programme
Civil Engineering
Faculty of Civil Engineering, Josip Juraj Strossmayer University of
Osijek**

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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 7

DISADVANTAGES OF THE STUDY PROGRAMME..... 7

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 *Civil Engineering* on the basis of the Self-Evaluation Report of the Programme, other documentation submitted and a visit to the Faculty of Civil Engineering – Josip Juraj Strossmayer University of Osijek which delivers the Programme.

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 programme *Civil Engineering*.

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 John Bridgeman, University of Birmingham, United Kingdom of Great Britain and Northern Ireland, President of the Expert Panel
- Professor Christopher Kotsakis, Aristotle University of Thessaloniki, Greece
- Professor Peter van Oosterom, Delft University of Technology, Netherlands
- Professor Ashraf S. Ayoub, City University London, United Kingdom of Great Britain and Northern Ireland

- Professor Hendrik Voll, Tallinn University of Technology, Estonia
- Professor Carl Christian Thodesen, Norwegian University of Science and Technology (NTNU), Norway
- Professor Johan Verbeke, Aarhus School of Architecture, Denmark
- Professor Elena Mussinelli, Politecnico di Milano, Italy
- Professor Franklin van der Hoeven, Delft University of Technology, Netherlands
- Iliana Tsali, doctoral candidate, University of Calgary, Canada
- Nicholas Lippiatt, doctoral candidate, KU Leuven, Belgium
- Samer Sabry Fahmy Mehanny Gendy, doctoral candidate, City University London, United Kingdom of Great Britain and Northern Ireland
- Teodora Iulia Constantinescu, doctoral candidate, Universiteit Hasselt, Belgium.

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

- Professor Ashraf S. Ayoub, City University London, United Kingdom of Great Britain and Northern Ireland
- Professor Hendrik Voll, Tallinn University of Technology, Estonia
- Nicholas Lippiatt, doctoral candidate, KU Leuven, Belgium.

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

- Davor Jurić, 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
- Study programme coordinators
- Doctoral candidates
- Teachers and supervisors
- Alumni.

The Expert Panel also had a tour of the facilities.

SHORT DESCRIPTION OF THE STUDY PROGRAMME

Name of the study programme contained in the licence: Postgraduate (Doctoral) University Study Programme in Civil Engineering

Institution providing the programme: Josip Juraj Strossmayer University of Osijek

Education provider: Faculty of Civil Engineering Osijek

Place of delivery: Osijek

Scientific area and field: Technical sciences, Civil Engineering

Learning outcomes of the study programme:

1. Independently identify, define and formulate a research problem.
2. Critically analyse, evaluate, and synthesize new and complex research ideas.
3. Demonstrate a systematic understanding of the study programme field, and a high level of knowledge within the field of expertise.
4. Independently conduct scientific research by using appropriate scientific methodologies.
5. Independently construct an experimental model and a measuring instrument.
6. Apply specific knowledge to generate new knowledge and research projects.
7. Publish scientific papers verified through national and international publications which contribute to the total corpus of knowledge.
8. Take responsibility for implementation of research and social utility of research findings.
9. Take on the most complex tasks in one's working environment.
10. Apply ethical principles during research, especially those pertaining to data confidentiality, professional relationship with associates, interpretation and dissemination of research findings.

During the study, attention is also directed towards the development of generic competencies. Therefore, upon completion of the postgraduate study programme, the doctoral candidates are capable of critically analysing their own achievements, showing the capability of abstract reasoning, applying knowledge in real-life situations, managing projects, transferring knowledge to others and accepting the role to motivate and direct others towards common goals.

Number of doctoral candidates: 47

Number of teachers: 22

Teachers employed at the Faculty of Civil Engineering in Osijek: 15

Teachers employed at other higher education institutions (HEI): 7

Number of supervisors/advisors: 13 (17)

Number of active mentors supervising doctoral candidates with registered title of doctoral theses: 4

Number of potential mentors (currently appointed advisors): 9

Number of potential mentors who fulfil the conditions prescribed for mentors, and who are currently not appointed as advisors or mentors: 17

Supervisor+advisor - candidate ratio: 13/47 (1 : 3.6)

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 up to three (3) years in which period the higher education institution should make the necessary improvements.

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME

1. Focus on quality of publications, not quantity.
2. Secure funds from the Croatian Science Foundation and the EU.
3. Improve international visibility.
4. Improve links with industry partners.
5. Improve communication with students.
6. Improve procedure for PhD viva examination.

ADVANTAGES OF THE STUDY PROGRAMME

1. New building.
2. Excellent laboratory facilities.
3. Good publication output of PhD students.
4. Enthusiastic students and supervisors.
5. Large number of internal projects.

DISADVANTAGES OF THE STUDY PROGRAMME

1. Low quality of publications.
2. Lack of international visibility.
3. Dropout rate.
4. Low level of research funding.
5. Heavy teaching for supervisors and students.
6. Tight schedule for both new and existing students.

EXAMPLES OF GOOD PRACTICE

1. Mechanism for internal funding.
2. Reduced students' fees.
3. Course evaluation procedure.
4. Flexible course offering.

Note of the Expert Panel: The University of Osijek finds itself in a difficult position. It is a relatively small establishment with a corresponding level of attendance. It also suffers from the economic climate, the continuous recession in Croatia and the state's extended reluctance to invest in research institutions as a result. In the Panel's opinion, the staff at Osijek are very aware of the current climate and have done all that could be expected of them under such conditions. They have shown a willingness to take risks and an openness to innovation that can only be admired. While it cannot yet be said whether these risks will pay off or if they are sustainable, the Panel would like to first and above all else express how impressed they were by the staff in Osijek and by the new Dean in particular. The Panel was also impressed by the new building and the new state of the art laboratories.

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

Minimal legal conditions:	
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	
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 (e.g. Artistic for those in the arts field) 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.	NO
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;	YES

<p>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);</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>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>	YES
<p>7. The supervisor normally does not participate in the assessment committees.</p>	NO
<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>	YES
<p>9. For joint programmes and doctoral schools (at the university level): cooperation between HEIs is based on adequate contracts; joint programmes are internationally recognized, and delivered in cooperation with accredited HEIs; the HEI delivers the programme within a doctoral school in line with the regulations (it is based on contracts in the case of multiple institutions, and the HEIs ensure good reaccreditation aimed at supporting the candidates); at least 80% of courses are delivered by teachers employed at HEIs within the consortium.</p>	N/A

QUALITY ASSESSMENT

<p>1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE</p>	<p>Quality assessment: “high level of quality” or “improvements are necessary”</p>
<p>1.1. HEI is distinguished by its scientific/ artistic achievements in the discipline in which the doctoral study programme is delivered.</p>	<p>Improvements are necessary While the research program at Osijek is acceptable, improvement is clearly needed in several areas. In particular, the quality of publications needs to seriously improve. Many of the papers are published in local journals that do not attract citations. Publications should be focused on international journals with high impact factors. A few papers were indeed published in such journals, but the number of these papers is relatively low. Furthermore, faculty members need to be more actively involved in competitively funded research projects. These include projects funded by the Croatian Science Foundation and, more importantly, the European Union. It is advised that the Faculty creates partnerships with other Croatian universities, such as the University of Zagreb, or other European universities to improve their chances for funding. Furthermore, the international visibility of the University of Osijek needs to be improved. Faculty members need to be more involved in international conferences, consortia, and meetings.</p>
<p>1.2. The number and workload of teachers involved in the study programme ensure quality doctoral education.</p>	<p>Improvements are necessary While 68% of the program is delivered by Osijek’s own staff, it is believed that the overall workload of many staff members is quite high. Many faculty members have a total workload exceeding 365 NH (norm hours) and at least 2 exceeding 500 NH. In addition, it was observed that the teaching load of the PhD students appointed in the faculty is quite high as well, while those currently on a scholarship have to take courses in addition to working on their research topic within a period of 3 years. Appropriate attention to the total workload of the faculty and PhD</p>

	students is needed.
1.3.The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.	<p>Improvements are necessary</p> <p>The teachers in the Faculty are indeed highly qualified professionals. However, the publication outputs of many faculty members need improvement. Faculty need to focus on publishing in internationally reputed journals with high impact factors in order to attract citations.</p>
1.4.The number of supervisors and their qualifications provide for quality in producing the doctoral thesis.	<p>Improvements are necessary</p> <p>The number of (potential) supervisors is satisfactory but the ratio of candidate : supervisor is 1 : 3.6, and therefore above the recommended level. The qualification of supervisors is high, but they need to improve their publication records. However, the completion rate of students needs to dramatically improve. Only a small percentage of students are able to successfully complete the program and care should be exercised to improve this rate.</p>
1.5.The HEI has developed methods of assessing the qualifications and competencies of teachers and supervisors.	<p>Improvements are necessary</p> <p>The performance of teachers and supervisors is monitored every 2 years, in particular the quality of their research. However, there is no formal mechanism to assess the overall performance including teaching and students supervision. More importantly, no mechanism is in place to improve the performance in case of any deficiency. The assessment process of teachers and supervisors need to be formalised to account for these issues.</p>
1.6.The HEI has access to high-quality resources for research, as required by the programme discipline.	<p>High level of quality</p> <p>The Faculty of Civil Engineering is to be congratulated on the completion of its new building which will provide an exciting educational environment for its students and staff members. Furthermore, the establishment of state of the art laboratory facilities within the building, while not fully completed, is a great accomplishment that will provide the students with the needed infrastructure to deliver high quality research. The Faculty is to be commended on its infrastructure accomplishments.</p>
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.	<p>Improvements are necessary</p> <p>The Faculty has developed a detailed procedure for the doctoral programme. The programme is rich in its scientific, research and educational aspects. However, improvement is needed to create links with potential industry partners</p>
2.2. The programme is aligned with the HEI research mission and vision, i.e. research strategy.	<p>Improvements are necessary</p> <p>The PhD programme is aligned with the mission and vision of the Faculty. However, improvement is needed to emphasize the importance of high quality publications rather than quantity in both the vision statement and the programme. Links with industry partners should be sought.</p>
2.3. The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.	<p>Improvements are necessary</p> <p>The Faculty monitors the programme through periodic evaluation of the supervisors that is conducted every 2 years. Feedback from students and teachers is also sought. However, no overall thorough evaluation of the programme including opinion of external evaluators was conducted before. Further, no mechanism exists by which the performance can be improved. No attempt was made to improve the quality of publications as opposed to quantity, or to involve industry partners though periodic feedback and co-supervision. Further, no effort was made to reduce the number of dropouts and increase the success rate. Further improvement is needed in these areas.</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 Faculty has in place a procedure to monitor supervisors' performance. The Faculty has contacts with former candidates, who can provide additional feedback regarding the programme. A procedure to mediate between students and supervisors and the possibility to change supervisor in case of conflict exist. However, no mechanism exists to improve the performance if unsatisfactory.</p>
2.5. HEI assures academic integrity and	<p>Improvements are necessary</p>

<p>freedom.</p>	<p>The Faculty has in place a procedure to ensure academic integrity and penalize plagiarism, but it is not clear how it is implemented in practice. It is recommended that the Faculty make use of commercially available plagiarism software that can aid in identifying potential plagiarism.</p>
<p>2.6. The process of developing and defending the thesis proposal is transparent and objective, and includes a public presentation.</p>	<p>Improvement are necessary The process for defending the thesis is transparent; however, supervisors should not be members of the exam panel. It is recommended that the panel includes members from the international community as well as from industry.</p>
<p>2.7. Thesis assessment results from a scientifically sound assessment of an independent committee.</p>	<p>Improvements are necessary The current process for thesis assessment is well documented. However, it needs to be improved to clearly allow for paper-based dissertations, and the inclusion of industry members and members from the international community in the exam panel. Students are required to publish a paper in peer-reviewed journal before the viva, but such publication should be only accepted if appearing in international journals with high impact factor. Papers published in local journals should not be counted.</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>Improvements are necessary The Faculty does publish all information about the programme on its website. However, this information seems to be targeting Croatian students only, with no access to students from the international community. Further, no information about research opportunities for PhD students is available.</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 The current strategy for distributing funds is transparent and the use of these funds to support internal research projects is to be commended. However, with the reduction in student fees, the current level of funding is relatively low and provides support for only a few numbers of students. Effort needs to be made to attract funding from different agencies such as the Croatian Science Foundation or the EU in order to provide sufficient financial support</p>

	to the research programme.
2.10. Tuition fees are determined on the basis of transparent criteria (and real costs of studying).	<p>High level of quality</p> <p>The current fee structure is transparent, fair, and takes into account the economic situation in the region. The Faculty is to be commended for taking the initiative to further reduce the fees in order to attract highly qualified students, which appears to be a successful strategy resulting in an increase in the number of admitted PhD students.</p>
3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION	
3.1. The HEI establishes admission quotas with respect to its teaching and supervision capacities.	<p>Improvements are necessary</p> <p>Improvement is needed with respect to the following:</p> <p>1. The teaching load: The students that both study and teach often have too many teaching responsibilities to give appropriate attention to their research. In addition, while in principle supervisors teach to within legal limits, there is some concern that this may be still infringe on their capacity to supervise and perform research.</p> <p>2. Admissions: There seems to be little control on who is admitted; those who can pay the annual cost (besides some formal conditions) can study.</p> <p>3. Active researchers: There is some concern that some supervisors are not active enough, in terms of production of high quality papers, to be considered sufficiently active researchers. This brings into question the quality of the supervision.</p>
3.2. The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs.	<p>Improvements are necessary</p> <p>It is not clear on what basis the student quotas were based on: demand, capacity, etc.</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	<p>Improvements are necessary</p> <p>While the Panel would like to acknowledge what it considers a positive change of the HEI offering institution funded projects, the Faculty needs to find more sources of funding so as to be able to provide</p>

projects or other sources of funding.	more potential projects to students.
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.	Improvements are necessary No clear research plan was presented. What was presented did not appear to be sustainable, although the Panel does understand why the choice was made and even approves the reasoning.
3.5. The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.	Improvements are necessary No international students are currently being hosted by the Faculty. This may be related to the fact that the HEI tends to publish in local journals, that courses are not offered in English and that the Faculty does not offer any international scholarships.
3.6. The selection process is public and based on choosing the best applicants.	Improvements are necessary The current process is not clear. Positions should at least be advertised online before being offered, and the University should make an effort to give a research proposal at the admissions stage.
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.	Improvements are necessary This has largely been addressed above, but the HEI could introduce some competition to their selection process, including multiple applicants to a position and an interview process.
3.8. There is a possibility to recognize applicants' and candidates' prior learning.	Improvements are necessary A procedure should be implemented so that if a candidate has extensive experience, or has been working in the industry for a long period (e.g. 10-15 years), that skill and knowledge can be recognised and that student's class obligation, perhaps, is reduced.
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.	Improvements are necessary While the Panel recognises the HEI's recent efforts to improve their supervision quality, there was no evidence of a specific system to ensure that quality, nor to ensure students were aware of all their rights. This can be addressed by changing the Faculty

	<p>website for easier access, appointing some kind of admissions advisor or having professors simply tell their students their rights.</p>
<p>3.10. There are institutional support mechanisms for candidates' successful progression.</p>	<p>Improvements are necessary In addition to the above, the Panel would like to see more support for conference attendance and international publication. There is also the opportunity to offer more transferable skills training such as in English and Project Management. This may make graduates more valuable to industrial partners and therefore facilitate future collaboration.</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>Improvements are necessary In general, the program is aligned with international recognized standards. According to the representative of the PhD program, the study programme can be compared with the postgraduate study programmes in the USA: University of Illinois at Urbana/Champaign, Purdue University, Indiana, University of California at Berkeley; and with other universities, such as Technische Hochschule Graz, ETH Zurich, Technische Universitat Darmstadt, TU Stuttgart. The program is research oriented and focusing on candidate's independent work. Teaching is included as required by the needs of candidate's research. However, the Expert Panel does not recognize the study program to be similar to any other postgraduate study programs, nor to the ones listed above. Admission of the students should be more clearly defined. At the moment everyone who can pay tuition is enrolled. In 2015, a total of 13 new PhD students were enrolled. Is there need for that number? Since the Faculty has recently hired many junior PhD graduates and industry has a low interest to hire PhD students, there could be a risk of overproducing PhD graduates. Many of the PhD students start with their specific research too late. The system of advisors and supervisor needs improvement. Thesis format could be based on monograph or research paper-based</p>

	<p>dissertation. Interdisciplinary research should be improved. More entrepreneur courses should be introduced for the students.</p>
<p>4.2. Programme learning outcomes, as well as the learning outcomes within it, 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>Improvements are necessary</p> <p>During the visit, the Faculty presented many illustrative examples in the Self-Evaluation Report about how programme learning outcomes, as well as the learning outcomes within it, are aligned with the level 8.2 of the CroQF. It is also very positive that students can evaluate the courses and lectures at the end of the study semester.</p> <p>The PhD students should start working with their specific research topic at an earlier stage. Currently there are some PhD students in their second year and they are still not sure about their specific research topic. Many PhD students face time pressure which lowers their capacity to achieve the learning outcomes and therefore the overall quality of the research. At least one paper should be published by each PhD student in a top level journal. This should be the quality mark for the learning outcomes as well. At the moment also local journals are accepted for publications and even in some cases open access journals.</p> <p>It seems that the learning methods are a bit old-fashioned. The doctoral program has not produced many entrepreneurs to the civil engineering sector. This means the learning outcomes do not entirely meet the criteria stated in 8.2 of the CroQF “delivering socially useful research results”. However, the graduates should be the most competent group in the sector and help the entire European civil engineering market with innovative ideas.</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>High level of quality</p> <p>During the interviews, the supervisors and PhD students introduced a two dimensional matrix table which shows precisely how certain learning outcomes of individual courses are connected with learning outcomes of the study programme and how they contribute to their achievement.</p>
<p>4.4. The doctoral programme ensures</p>	<p>Improvements are necessary</p>

<p>the achievement of learning outcomes and competencies aligned with the level 8.2 of the CroQF.</p>	<p>In general the PhD thesis seems to be in a good scientific quality.</p> <p>All the theses were written in Croatian, so it is very hard for international experts to give objective evaluation about the quality of the thesis based on international standards. The Faculty should promote PhD students to write the thesis also in English.</p> <p>All the theses are written as monographs. The Faculty needs to encourage PhD students also to write research paper-based dissertations. This would facilitate evaluation of the scientific level.</p> <p>Also, the number of high-impact publications published in top level journals should be increased.</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>Improvements are necessary</p> <p>Teaching methods are directed more towards individual research work taking into consideration the student's wishes and needs with monitoring and support provided by teachers. Interviewed PhD students were pleased with teaching methods and learning outcomes.</p> <p>Since the teaching methods consider each PhD student individually, it is difficult to evaluate the teaching methods and to give overall evaluation. Apparently the teaching methods and learning outcomes are uneven for different courses. Currently the Sectoral Council of Civil Engineering and Geodesy is formed which hopefully helps to evaluate more objectively the teaching methods and learning outcomes.</p> <p>Many PhD students mentioned that the outcome of the course is scientific paper. However, the Expert Panel recommends to publish less in quantity, but improve the quality of scientific publications.</p>
<p>4.6. The programme enables acquisition of general (transferable) skills.</p>	<p>Improvements are necessary</p> <p>In academic year 2015/2016, the Faculty organized the following seminars to support students and teachers in developing business and management skills through organisation of workshops (Project management and doctoral research, how to choose the best journal, corruption in science and higher education and tools for prevention of corruption, tools for management of scientific literature). There is also</p>

	<p>an option for PhD students besides the six compulsory courses to take two courses in the subjects that provide for acquisition of generic (transferable) skills. Participation in the seminars organized by the Faculty was low. PhD students rather replace the two extra courses with credits achieved from a publication. The Faculty needs to promote more the seminars and explain the importance of general transferable skills to PhD students.</p> <p>The Panel recommends that there should be more courses about business development and entrepreneurship. The Faculty should promote these skills for the students.</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>Improvements are necessary</p> <p>Teachers of the PhD courses demonstrated that the courses delivered are flexible and adapted to individual academic needs and research plans. All interviewed PhD students were in general satisfied with the content and adaptation of the courses. The students admitted the courses help them to develop and progress in their research.</p> <p>However, PhD graduates after their dissertations mainly are aiming for academic positions at the University or work at governmental institutions. Only a very few graduates end up working in an industry position. Members of the faculty and students even admit that civil engineering industry is not interested in PhD students. The attitude of the PhD students was that if industry hires them they will get very low salary, so the attitude was very pessimistic. Considering that the university PhD level graduates should be the most innovative group in the sector, this is a clear message that something need to be changed. The Panel recommends that there should be more courses about business development and entrepreneurship. The Faculty should promote these skills for the students.</p>
<p>4.8. The programme ensures quality through international connections and teacher and candidate mobility.</p>	<p>Improvements are necessary</p> <p>Strengthening national and international cooperation with faculties and scientific research institutions and maintaining of existing cooperation relationships is</p>

one of the tasks defined in the Development Strategy of the Faculty of Civil Engineering 2016- 2020. The Faculty has some international cooperation. For example, the Faculty has been included in the work of international symposium intended for doctoral candidates at the University of Pecs, Hungary. Also round tables have been organized with Universities from Slovenia, Serbia, BIH and Australia where improvement of cooperation between institutions was discussed. In March 2016, the project of joint graduate and doctoral study programme within the programme Erasmus+KA2 strategic partnerships University of Osijek-Faculty of Civil Engineering, Bauhaus-Universitat Weimar, University of Ljubljana, University of Aveiro, Budapest University of Technology and Economics was applied. The result of the proposal was still unknown for the reviewers when writing the report. One positive observation is also that Faculty teachers' visits to international conferences are co-financed from the Faculty's own resources.

However, the Faculty admits that when it comes to international connections there is room for improvement and they expect significantly greater engagement of all employees in this area. In order to ensure better international connection and mobility, it is necessary to increase the number of scientific research and development projects at national and international level.

There are currently no international faculty members or PhD students enrolled in the Faculty. This should be changed. There are no international supervisors (neither co-supervisors) for PhD students. This should be improved. Also in the PhD defence scientific panel, one international member should be included.

Many resources are available for teachers and PhD students. Also, the Faculty encourages doctoral candidates to participate and apply for international training under available foundations and programmes like The British Scholarship Trust, AMAC-UK, Erasmus+ KA1, Fulbright Program, and DAAD. One positive aspect is also that the Faculty covers in part

the conference fee (transport and registration) for PhD students.

Only a very marginal number of teachers and students have used the opportunity to spend a part of their education on another foreign HEI. The Faculty needs continuously to promote the positive effect of international experience and should more actively encourage its staff to apply to the mobility scholarships.