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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 *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, University of Zagreb 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
- External stakeholders
- 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: University of Zagreb

Education provider: Faculty of Civil Engineering of the University of Zagreb

Place of delivery: Kačićeva 26, 10000 Zagreb

Scientific area and field: Technical sciences, Civil Engineering

Learning outcomes of the study programme:

- Create, analyse, evaluate and present new theoretical knowledge in the field of scientific research,
- Plan and organize scientific research,
- Approach research problems in an independent and interdisciplinary manner,
- Collect information on research based on critical reading and analysis of literature,
- Formulate a methodology for conducting scientific research,
- Set a scientific hypothesis,
- Identify and, if necessary, create the most appropriate methods for the collection of relevant data,
- Select and, when necessary, construct instruments for data collection,
- Collect data,
- Evaluate and choose the best data processing methods,
- Perform qualitative and quantitative valorisation of collected data,
- Critically assess data processing results,
- Make a correct systematization and generalization,
- Confirm or reject hypotheses,
- Reach conclusions,
- Assess research results critically,
- Make recommendations for further research,
- Present research results in writing and verbally,
- Take responsibility for the results of their research according to principles of scientific ethics,
- Solve complex social and economic problems creatively and on the basis of research,
- Critically evaluate the works of others.

Number of doctoral candidates: 125 (37 candidates enrolled according to the new doctoral programme; 88 candidates enrolled according to the old doctoral programme).

Number of teachers: 52

Teachers employed at the Faculty of Civil Engineering in Zagreb: 49

Teachers employed at other higher education institutions (HEI): 3

Number of supervisors: 36 (44 total with potential supervisors)

Number of active mentors supervising doctoral candidates with registered title of doctoral theses: 14

Number of potential mentors (currently appointed advisors): 22

Number of potential mentors who fulfil the conditions prescribed for mentors, and who are currently not appointed for any postgraduate students, whether as advisors or mentors: 8

Ratio between doctoral students and supervisor/advisor: 125/36 (3.5)

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 recommendation 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 additional research funds.
- 3. Reduce overall teaching load.
- 4. Improve links with industry partners.
- 5. Improve communication with students.

ADVANTAGES OF THE STUDY PROGRAMME

- 1. Many EU/CSF projects.
- 2. International visibility (e.g. conference organization, books, awards).
- 3. Collaboration with international partners/mobility.
- 4. Links with industry.
- 5. Good lab facilities.

DISADVANTAGES OF THE STUDY PROGRAMME

- 1. Low quality of publications (few citations).
- 2. Heavy teaching for supervisors and students.
- 3. Dropout rate.
- 4. Tight schedule for both new and existing students.
- 5. Low level of funds.

EXAMPLES OF GOOD PRACTICE

- 1. Link with industry.
- 2. Mentoring workshop.
- 3. Annual PhD symposium.
- 4. Organization of international and national conferences.

Note of the Expert Panel: The University of Zagreb has a good reputation and international standing due to its history and continued participation in international events, including an annual conference that they host and organize. The Panel recognizes the quality of the University as well as the program it offers, but suggests that, if it wants to reach the top level of quality at an international level in the current economic climate, it needs to be more open to change and innovation.

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

Minimal legal conditions:	YES/NO	
1. Higher education institution (HEI) is listed in the Register of Scientific	YES	
Organisations in the scientific area of the programme, and has a positive		
reaccreditation decision on performing higher education activities and scientific		
activity.		
2. HEI delivers programmes in the two cycles leading to the doctoral programme, i.e.,	YES	
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).		
3. HEI employs a sufficient number of researchers, as defined by Article 7 of the	YES	
Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-		
Accreditation of Scientific Organisations and Content of Licence (OG 83/2010).		
4. At least 50% of teaching as expressed in norm-hours is delivered by teachers	YES	
employed at the HEI (full-time, elected into scientific-teaching titles).		
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	YES	
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.		
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-	YES	
teaching titles in the field, or fields relevant for the programme involved in its		
delivery.		
2. In the most recent reaccreditation, HEI had the standard Scientific and Professional	YES	
Activity (e.g. Artistic for those in the arts field) marked as at least "partly		
implemented" (3).		
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:	YES	
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,	
participant, collaborator or in other ways;	
e) trained for the role before assuming it (through workshops, co-supervisions etc.);	
f) received a positive opinion of the HEI on previous supervisory work.	
6. All teachers meet the following conditions:	YES
a) holds a scientific or a scientific-teaching position;	
b) active researcher, recognized in the field relevant for the course (table 1,	
Teachers).	
7. The supervisor normally does not participate in the assessment committees.	YES
8. The programme ensures that all candidates spend at least three years doing	YES
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.	
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.	

QUALITY ASSESSMENT

	Quality assessment 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.	Improvements are necessary The programme at the Faculty of Civil Engineering of the Zagreb University is characterised by its high visibility and international reputation. The faculty members are indeed involved in several European research projects and projects funded by the Croatian Science Foundation, an issue that deserves commendation and that resulted in several awards. The organization of several national and international conferences contributed to the visibility of the programme. However, one area that deserves major improvement is publications. Many papers are published in local journals that do not attract citations. In particular, all papers published by the PhD students received no citations at all, and those published by supervisors received a small number of citations, with a few exceptions. Publications should be focused on international journals with high impact factors in order to attract a large number of citations.
1.2. The number and workload of teachers involved in the study programme ensure quality doctoral education.	Improvements are necessary While 93% of the program is delivered by Faculty'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 hours and at least 3 exceeding 600 hours. 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 students is needed.
1.3. The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.	Improvements are necessary 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.
1.4. The number of supervisors and their qualifications provide for quality in	Improvements are necessary The number of supervisors is satisfactory and the ratio of

producing the doctoral thesis.	candidate : supervisor is 3.5:1 and therefore above recommendation. 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 is able to successfully complete the program and care should be exercised to improve this rate.
1.5.The HEI has developed methods of assessing the qualifications and competencies of teachers and supervisors.	Improvements are necessary The performance of teachers and supervisors is monitored every year by the Science Board, in particular the quality of their research. An annual report is then delivered to the Faculty Council and University. 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. The Faculty organises a mentoring workshop for new supervisors to aid them at the start of their academic career, but overall improvement in the methods of assessment and potential remedies is still needed.
1.6.The HEI has access to high-quality resources for research, as required by the programme discipline.	High level of quality The Faculty is equipped with state-of-the-art laboratory facilities that provide students with the needed infrastructure to deliver high quality research. However, improvement is still needed to continuously upgrade and renovate these facilities within the allocated space with modern equipment.
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.	Improvements are necessary The Faculty has developed a detailed procedure for the doctoral programme that is in line with University regulations. The programme is rich in its scientific, research and educational aspects. Involvement of industry stakeholders was sought, and the industry partners seem enthusiastic about their relationship with the Faculty. However, improvement is needed to further involve the industry partners in providing feedback regarding PhD research topics, assessment and dissertation defence, opportunities for collaboration with new supervisors, as well as providing direct link to PhD students in order to secure potential future employment.

2.2.	The programme is aligned with the HEI research mission and vision, i.e. research strategy.	Improvements are necessary 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 also improved.
2.3.	The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.	Improvements are necessary The Faculty monitors the programme through periodic evaluation of the supervisors. An internal evaluation was conducted once before by the Doctoral Study Board and with help from external evaluators. However, 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 better involve industry partners though periodic feedback and co- supervision. Furthermore, no effort was made to reduce the number of dropouts and increase the success rate. Further improvement is needed in these areas.
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.	Improvements are necessary The Faculty has in place a procedure to monitor supervisors' and students' performance every year. The Faculty has contacts with former candidates, who can provide additional feedback regarding the programme. However, no mechanism exists to improve the performance if unsatisfactory. Also, no mechanisms exist to mediate between student and supervisor in case of conflict.
2.5.	HEI assures academic integrity and freedom.	Improvements are necessary The Faculty has in place a procedure to ensure academic integrity and penalize plagiarism. It is recommended that the Faculty make use of commercially available plagiarism software that can aid in identifying potential plagiarism.
2.6.	The process of developing and defending the thesis proposal is transparent and objective, and includes a public presentation.	Improvements are necessary The process for defending the thesis is transparent, and supervisors are not members of the exam panel. It is recommended that the panel includes members from the international community as well as from industry. The number of panel members could be increased to more than 3.
2.7.	Thesis assessment results from a scientifically sound assessment of an	Improvements are necessary The current process for thesis assessment is well

independent committee.	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. While students would have normally published a paper in peer-reviewed journal before the viva, publication of at least a paper in international journals with high impact factor should be required. Papers published in local journals should not be counted.
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.	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 and no emphasis is given on students from the international community. Further, while the faculty members are successful in obtaining research funding from different agencies, no information about research opportunities for PhD students is available, and no effort is made to attract highly qualified students from the International community through these grants.
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).	Improvements are necessary The current strategy for distributing funds is transparent, but relies on allocating them mostly for administrative services that support the research. More funds need to go directly to the students in the form of purchasing materials and equipment needed for their research or for other technical services. Further, while the Faculty was successful in obtaining research grants from different agencies, the current level of funding is relatively low and provides support for only a small numbers of students. More effort needs to be made to increase the level of external funding.
2.10. Tuition fees are determined on the basis of transparent criteria (and real costs of studying).	High level of quality The current fee structure is transparent, fair, and takes into account the economic situation in the region and country.
3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION	
3.1. The HEI establishes admission quotas with respect to its teaching and supervision capacities.	Improvements are necessary The HEI needs to implement a true maximum quota. This has not yet become a problem as the capacity of supervisors has not been exceeded, but assuming the

	program grows as desired this will become an issue in the future and the HEI should be prepared for it.
3.2. The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs.	Improvements are necessary There is not a set quota. Is this based on the capacity of the HEI or the capacity of the economy to absorb graduates? There is no evident connection between the HEI and the external economy. One issue raised in the meeting is that historically the largest supporter has been the state and this has ended. The University should accept this is unlikely to change, the road system in Croatia is new and high quality, unlikely to need any major work in the near future, and adapt. Alternate focuses could be rail or materials development in which the University has had previous success.
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.	High level of quality Considering the number of staff and funding they do have, the number of students is fit to their capabilities. However, the HEI needs more funding to support more students and research. Industry and CSF seem the likeliest candidates, but applications need to be made with realistic perspective on the needs and capacities of industry.
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 There is no sustainable research plan. Students should plan in more detail, with a timetable, how and when they will achieve important milestones in their research journey. This also has repercussions in the area of transferrable skills, i.e. project management.
3.5. The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.	Improvements are necessary While there are a number of international students at the HEI, the number is limited as is the number of countries they come from. More information should be published online concerning the possibility of attendance and the option of classes and dissertations in English. The Panel acknowledges some steps in this direction have already been made. The HEI might also consider offering an international scholarship and trying to increase its networking and participation at international conferences to make foreign professors aware of the possibility so they can pass it on to their Master's students.
3.6. The selection process is public and	Improvements are necessary

based on choosing the best applicants.	While the Panel expresses no concerns with the quality of the current batch of students, the lack of international students is symptomatic. More information should be made available concerning the options at the HEI.
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.	High level of quality The quality of the system is unclear since recent changes have not yet existed long enough to bear fruit. The Panel believes the current system is of high quality, but suggests efforts to increase competition for positions are maintained.
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 there is a system in place to inform students, there is some concern that students are not adequately informed of their rights and responsibilities. This should be addressed.
	Improvements are necessary The HEL should be producing more publications of higher
3.10. There are institutional support mechanisms for candidates' successful progression.	quality and more conference attendance. If this requires less papers in total produced, it may be worth the sacrifice. There is also the concern of a lack of transferable skills, such as project management and foreign language (English), being taught to students. The Panel recognises that in some universities around the world classes are added to curriculum so that the concern for transferable skills is addressed 'officially' without actually increasing the capacities of their students. The HEI should be careful about implementing such requirements to their curricula, especially considering the already existing time restrictions. PhD students should mostly learn by doing, but language, presentation, communication and management skills are valuable and should be included in a doctoral program.
 3.10. There are institutional support mechanisms for candidates' successful progression. 4. PROGRAMME AND OUTCOMES 	quality and more conference attendance. If this requires less papers in total produced, it may be worth the sacrifice. There is also the concern of a lack of transferable skills, such as project management and foreign language (English), being taught to students. The Panel recognises that in some universities around the world classes are added to curriculum so that the concern for transferable skills is addressed 'officially' without actually increasing the capacities of their students. The HEI should be careful about implementing such requirements to their curricula, especially considering the already existing time restrictions. PhD students should mostly learn by doing, but language, presentation, communication and management skills are valuable and should be included in a doctoral program.

	compared with the postgraduate study programmes in Europe (Graz, Budapest). Also, the Faculty representatives traditionally participate in meetings organized by AECEF (Association of European Civil Engineering Faculties). The study programs and possible changes are always discussed at AECEF meetings. The programme is research oriented and focusing on candidate's independent work. Teaching is included as required by the needs of candidate's research. At the moment, basically everyone who can pay tuition is accepted. At the moment up to 30 PhD students can be enrolled yearly. But is there need for that number of PhD graduates? Since the Faculty has recently hired many junior PhD graduates and industry has a low interest in hiring PhD students, there could be a risk of overproducing PhD graduates. The Expert Panel recommends that the Faculty should investigate what is the objective need for yearly PhD graduates and adjust the numbers accordingly. More entrepreneurial courses should also be introduced to the students. This would make the PhD graduates more attractive to local, but also to international civil engineering sector.
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.	Improvements are necessary The Faculty presented clearly how the programme learning outcomes, as well as the learning outcomes within it, are aligned with the level 8.2 of the CroQF. 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. Also, it seems that the learning method is in some extent a bit old-fashioned. The programme has not produced many entrepreneurs to the civil engineering sector. This means the learning outcomes do not entirely meet the criterion 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 rather create jobs and to hire people, not to be hired as it is at the moment. More innovations and risky research ideas are needed.
4.3. Programme learning outcomes are logically and clearly connected with	Improvements are necessary PhD students need to take one compulsory course

teaching contents, as well as the contents included in supervision and research.	"Methodology of Scientific Research". The course has learning outcomes that are logically and clearly connected with teaching and research content. Besides one compulsory course, there are elective courses. However it is not clear how these elective courses that are offered are aligned with the program learning outcomes. This should be explained more.
4.4. The doctoral programme ensures the achievement of learning outcomes and competencies aligned with the level 8.2 of the CroQF.	Improvements are necessary In general, the PhD theses seem to be of a good scientific quality. Currently there is one PhD student who is writing the thesis in English. All the theses presented to the Expert Panel were written in Croatian, so it was very hard for international experts to give objective evaluation about the quality of the thesis based on international standards. Faculty should promote PhD students to write the thesis in English. All the theses are written as monographs. The Faculty needs to encourage PhD students also to write research paper-based dissertations. This would enable to compare the scientific level more properly. Also, the number of high-impact publications published in top level journals should be increased.
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.	Improvements are necessary 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 mainly pleased with teaching methods and learning outcomes. 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 being formed, which will hopefully help to evaluate the teaching methods and learning outcomes more objectively.

	The Panel recommends that there should be more courses about business development and entrepreneurship. The Faculty should promote these skills for the students.
4.7. Teaching content is adapted to the needs of current and future research and candidates' training (individual course plans, generic skills etc.).	Improvements are necessary Teachers of PhD courses demonstrated that the courses delivered are flexible and adapted to individual academic needs and research plans. Interviewed PhD students were mainly satisfied with the content and adaptation of the courses. The students admitted the courses help them to develop and progress in their research. After their dissertations, PhD graduates mainly aim at academic positions at the University or work at governmental institutions. Only a very few graduates end up working in industry positions. 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. Considering that the university PhD level graduates should be the most innovative group in the sector, this is a clear message that somethings needs to be changed. The Panel recommends that there would be more courses about business development and entrepreneurship. The Faculty should promote these skills for the students.
4.8. The programme ensures quality through international connections and teacher and candidate mobility.	Improvements are necessary Currently there are 3 international professors and 6 international PhD students at the Faculty. It is also positive that the Faculty is aiming to increase that number. Also, the Faculty encourages doctoral candidates to participate in international conferences and apply for international training under available foundations and programmes. In the Self-Evaluation Report it was stated that at least six students have taken part in the international mobility during the last years. Presented examples involved study mobility to very prestigious universities. Also, the Faculty has joint research with some very well recognized universities, and international experts are invited to come and give lectures in locally organized symposiums. 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.

Only a relatively marginal number of teachers and students
have used the opportunity to spend a part of their
education on another foreign HEI. Faculty needs to
continuously promote the positive effect of international
experience and should more actively encourage its staff to
apply for the mobility scholarships.
One negative observation is also that many academic staff
members admitted that due to large work load they are
unable to participate in conferences. A few PhD students
said the available funding for international study visits is
very limited and there is no resources available for
everyone. Faculty should keep looking for opportunities to
improve that.
The Expert Panel also recommends that in the PhD defence
scientific panel, one international member should be
included.