



**Report
of the Expert Panel
on the REACCREDITATION
of the University Postgraduate (Doctoral) Programme
in Civil Engineering
Faculty of Civil Engineering, Architecture and Geodesy, University of
Split**

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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..... 5

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME..... 6

ADVANTAGES OF THE STUDY PROGRAMME 6

DISADVANTAGES OF THE STUDY PROGRAMME 6

EXAMPLES OF GOOD PRACTICE 6

COMPLIANCE WITH THE PRESCRIBED CONDITIONS FOR THE DELIVERY OF A STUDY PROGRAMME..... 7

QUALITY ASSESSMENT 9

INTRODUCTION

The Expert Panel appointed by the Agency for Science and Higher Education (ASHE) created this Report on the Re-accreditation of the University Postgraduate (Doctoral) Programme in 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, Architecture and Geodesy, University of Split.

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:

- Professor John Bridgeman, University of Birmingham, UK - President of the Expert Panel,
- Professor Christopher Kotsakis, Aristotle University of Thessaloniki, Greece
- Professor Peter van Oosterom, Delft University of Technology, Netherlands
- Iliana Tsali, doctoral candidate, University of Calgary, Canada
- 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
- Professor Elias Kassa G., Norwegian University of Science and Technology (NTNU), Kingdom of Norway
- Samer Sabry Fahmy Mehanny Gendy, doctoral candidate, City University London, United Kingdom of Great Britain and Northern Ireland
- 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
- Teodora Iulia Constantinescu, doctoral candidate, Universiteit Hasselt, Belgium

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

- Professor John Bridgeman, University of Birmingham, UK
- Professor Elias Kassa, Norwegian University of Science and Technology, Norway
- Mr Samer Gendy, doctoral candidate, City University, UK

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

- Durdica Dragojević, coordinator and interpreter, ASHE,
- Davor Došlinec, assistant coordinator, 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 library, laboratories, IT rooms, and the classrooms.

SHORT DESCRIPTION OF THE STUDY PROGRAMME

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

Institution providing the programme: University of Split, Faculty of Civil Engineering, Architecture and Geodesy

Education provider(s): University of Split, Faculty of Civil Engineering, Architecture and Geodesy

Place of delivery: Split

SPLIT

Scientific area and field: Technical Science; Civil Engineering and Other Basic Technical Sciences

Learning outcomes of the study programme:

Ph.D. in Civil Engineering after the completion of their studies acquire a very high level of scientific education in the field of their profession, which is based on scientific researches, have possibility for employment in a public and a private sector, having the competence in the following:

to acquire new scientific knowledge;

to convey knowledge to their students;

to apply their knowledge in practice as well as helping the people of Croatia and the citizens of the world to spread and develop scientific ideas to be able to find out and to solve the problems;

to pressure knowledge as the basic value of the development and mankind's existence;

to carry out the highest scientific and research works;

to work in scientific and educational institutions;

to achieve a higher professional status in scientific and scientific-educational institutions,

to participate in scientific teams who deal with scientific programmes and the studies in our country and abroad;

to work independently in the studies and scientific programmes in our country and abroad;

to work as a manager in applied and developing economy programmes;

to be in charge in the teams who realize the most complex tasks in firms, chamber of commerce as well as in local and state administration offices.

Number of doctoral candidates: 22

Number of teachers: 34

Number of supervisors: 25

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:

1. issue a confirmation on compliance for performing parts of activities (renew the licence and label it as 'high quality')

RECOMMENDATIONS FOR THE IMPROVEMENT OF THE STUDY PROGRAMME

1. Introduce interviewing of applicants for place on the doctoral study programme.
2. Increase advertising of the doctoral study programme to increase international applications.
3. Introduce use of plagiarism detection software.
4. Consider increased use of English language for thesis writing to improve Faculty visibility internationally.
5. Consider reductions in taught course requirements for doctoral candidates.

ADVANTAGES OF THE STUDY PROGRAMME

1. Good opportunities for acquisition of general (transferable) skills
2. Close liaison with Croatian industry.
3. Reward mechanism for publication.

DISADVANTAGES OF THE STUDY PROGRAMME

1. Significant obligation to attend taught classes.
2. Lack of internationalisation, particularly with regard to overseas PhD student intake.
3. Availability of experienced Technicians in the laboratories.

EXAMPLES OF GOOD PRACTICE

1. Competition to select the best candidate to participate in funded projects.
2. Candidate peer review of each other's research.
3. Requirement to publish one paper in a reputable journal.
4. Robust selection and monitoring of PhD candidates
5. Good involvement with H2020 / FP7 projects.

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

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

9. For joint programmes and doctoral schools (at the university level): cooperation between HEIs is based on adequate contracts; joint programmes are delivered in cooperation with accredited HEIs; the HEI delivers the programme within a doctoral school in line with the regulations and ensures good coordination aimed at supporting the candidates; at least 80% of courses are delivered by teachers employed at HEIs within the consortium.	YES
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QUALITY ASSESSMENT

	Quality assessment (“high level of quality” or “improvements are necessary”) and the explanation of the Expert Panel
1. RESOURCES: TEACHERS, SUPERVISORS, RESEARCH CAPACITIES AND INFRASTRUCTURE	
1.1. HEI is distinguished by its scientific/artistic achievements in the discipline in which the doctoral study programme is delivered.	<p>High level of quality</p> <p>The Panel recognised the Faculty’s (FCEAG’s) pre-eminence in Croatian HE in specific areas, notably hydrotechnics, structures and numerical methods. The Faculty has demonstrated an increasing number of scientific papers published in ISI journals. It is noted that there has been a year-on year increase every year since 2005 (with minor exceptions of 2010 and 2014 which saw modest reductions). It is pleasing to note the increased use of higher impact factor journals (39 Q1 and 32 Q2 papers in the last five years).</p> <p>Citations have also increased correspondingly, albeit there was a slight drop in 2010 and 2014. The degree of self-citation is not excessive.</p> <p>The Panel recognised the Faculty’s own publication activities via the <i>International Journal for Engineering Modelling</i>. The Panel recommended that the Editorial Board sought to secure an Impact Factor for this journal.</p> <p>The Panel was impressed with the Faculty’s involvement with EU projects (FP6, FP7, H2020 etc) and also its ongoing collaborations in Japan that clearly add vitality to the research environment.</p> <p>The Panel recognised the Faculty’s efforts on organising conferences and summer schools for junior researchers and commends the Faculty on this work.</p>
1.2. The number and workload of teachers involved in the study programme ensure quality doctoral education.	<p>High level of quality</p> <p>The Panel observed that almost all courses delivered by the Faculty’s own staff and that the workload distribution is appropriate for the discipline and country.</p> <p>The number of teaching staff involved in the study programme is appropriate to the size of PhD student cohorts and, indeed, the Panel noted the potential for expansion in student numbers based on current staff numbers.</p>
1.3. The teachers are highly qualified researchers who actively engage with the topics they teach, providing a quality doctoral programme.	<p>High level of quality</p> <p>All supervisors are required to have a PhD and some prior supervisory experience (i.e. as a co-supervisor).</p> <p>The Faculty’s recent publication record shows that its staff are</p>

	<p>research active in the fields of structures, hydrotechnics, geotechnics, construction management and transportation and are publishing outputs in respectable, peer-reviewed international journals.</p>
<p>1.4. The number of supervisors and their qualifications provide for quality in producing the doctoral thesis.</p>	<p>High level of quality The quality of supervisors is monitored and amended annually as necessary. The Panel noted good practice in the Faculty's management of its supervisory team. The Panel noted that the ratio of candidates to supervisors is less than 3:1 and therefore in line with requirements.</p> <p>The Panel recognised that the activity of some academics with FP7 projects is an indirect indicator of quality of academics and their research.</p> <p>Completion rates were not transparent to the Panel; however, as most candidates are Teaching Assistants, the inferred rate appeared to the Panel to be within the average of six years.</p>
<p>1.5. The HEI has developed methods of assessing the qualifications and competencies of teachers and supervisors.</p>	<p>High level of quality The Panel noted University requirements for qualifications and competencies of supervisors and further noted that these were adhered to by the Faculty. The Panel noted that the Postgraduate University Doctoral Study Committee assesses each supervisor's success rate and outputs on at least a biennial basis.</p>
<p>1.6. The HEI has access to high-quality resources for research, as required by the programme discipline.</p>	<p>Improvements are necessary Current students advised that laboratory facilities were improving and were planned to improve further over forthcoming years. However, the Panel noted the low Technician resource (2) available to staff and students and considered this to be too low for a viable and sustainable research laboratory.</p> <p>Both current students and alumni advised the Panel that journal access via electronic databases can be slow, but the Library can generally be relied upon to procure a paper, even if it does take time. The Panel noted that this situation could be alleviated if the Faculty chose to divert some of its own funds to securing improved database access.</p>
<p>2. INTERNAL QUALITY ASSURANCE OF THE PROGRAMME</p>	
<p>2.1. The HEI has established and accepted effective procedures for proposing, approving and delivering doctoral education. The procedures include</p>	<p>The Civil Engineering doctoral programme was launched in 1992 and, as one of the most significant and oldest constituent faculties of the University of Split, the Faculty is required to generate scientific excellence.</p>

<p>identification of scientific/ artistic, cultural, social and economic needs.</p>	<p>FCEAG also contributed in the development of the Faculty of Civil engineering in Mostar so that the majority of research staff completed their doctoral study in Split.</p> <p>The Panel was pleased to note that the Faculty takes cognisance of industry (and so economic and social) needs when developing its research programmes. It also builds its research programmes based on areas of existing strength.</p> <p>The Bologna Process is now adopted by the doctoral study programme.</p>
<p>2.2. The programme is aligned with the HEI research mission and vision, i.e. research strategy.</p>	<p>High level of quality</p> <p>As part of the reaccreditation process, the Faculty presented a detailed research strategy. The Doctoral study programme contains all elements defined in the strategic documents of FCEAG. Moreover, 27 research topics were described in detail.</p> <p>The ordinances explained the procedure for the selection of candidates, supervisors and co-supervisors. Also the candidates' obligations in all phases of research within the doctoral dissertation were defined.</p> <p>The Panel recognised that the Faculty has assessed its strengths and weaknesses and is aware of both and, crucially, has plans on how to address them (i.e. limited laboratories equipment and small number of experienced technicians). The Panel saw this self-awareness as an area of strength and good practice.</p>
<p>2.3. The HEI systematically monitors the success of the programmes through periodic reviews, and implements improvements.</p>	<p>Improvements are necessary</p> <p>The Panel was advised that the Faculty does not conduct any international programme review. However, publication in international peer-reviewed journals is considered as an external assessment of the study programme.</p> <p>The Panel noted the following points of good practice from the SER:</p> <ul style="list-style-type: none"> -Any change in the study programme requires review by the University's Quality Improvement Centre. -The selection of supervisors and candidates is made by the doctoral study committee. -An annual report of the supervisor's and candidates is used for monitoring research work. -Monitoring of research yield of the candidate and the supervisor and their reward is achieved via the rewarding ordinance. -Candidates' work and progress is monitored via taught courses and presentations at conferences. -The Faculty offers the possibility of supervisor substitution in cases where this may be considered appropriate. -Implementation of a qualification doctoral exam in order to test the learning outcomes at the 7th level acquired at the preparatory year.

	<p>- Public assessment and defence of the proposal. - Faculty quality assurance system also undertakes study programme evaluation through a process of internal evaluation.</p> <p>However, the Panel identified that ongoing candidate assessment system is not applied formally, with the principal assessment being made by the supervisor through direct contact with the student.</p>
<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>	<p>High level of quality The Panel noted that the means to monitor and ensure quality of supervision are outlined in the SER and are in accordance with University ordinances.</p> <p>The Panel was pleased to note the following: - Article 33 defines essential criteria for the selection of the supervisor, submission of the supervisor's report on the candidate's work and the evaluation of the work. - The supervisor can be replaced and the thesis proposal can be changed. - The teacher who meets the criteria for supervision can supervise no more than 3 candidates per generation. - Rewarding of successful supervisors is conducted through an internal ordinance and rewarding is based on (scientific papers, citation index, university textbooks and accepted patents). - The Panel was advised that each supervisor's work is monitored over rolling five year periods and the number of the supervisor's publications is also assessed, thus confirming (or otherwise) scientific excellence.</p>
<p>2.5. HEI assures academic integrity and freedom.</p>	<p>Improvements are necessary Whilst the Panel recognised the several ways in which unethical behaviour might be reported within the Faculty, the Panel was concerned to note the lack of use of an electronic authentication system to assure academic integrity (e.g use of Turnitin for 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>High level of quality From the SER and interviews with staff and candidates, the Panel noted the following points of good practice</p> <p>- The procedures of writing and defending the doctoral thesis proposal are prescribed by the ordinance on the postgraduate University (doctoral) study of Civil Engineering (Articles 39-45). - Pursuant to the ordinance the committee for thesis proposal approval consists of three members of which at least one has to be an external member, not employed at FCEAG. - FCEAG has a protocol on defending thesis proposal published on the website.</p>

	<p>-FCEAG has forms for thesis proposal application and guidelines for the presentation of the public discussion. -FCEAG has forms for thesis proposal assessment.</p> <p>- The Panel noted that the majority of candidates appear to write their thesis in Croatian. Whilst this is entirely acceptable, the Panel suggests that the Faculty reflects on the possible benefits of encouraging candidates to write their dissertation in English and so improve English language skills and improve the Faculty visibility internationally.</p>
<p>2.7. Thesis assessment results from a scientifically sound assessment of an independent committee.</p>	<p>High level of quality The Panel was pleased to note areas of high quality associated with the assessment of doctoral theses; in particular:</p> <ul style="list-style-type: none"> -Doctoral thesis assessment committee has at least one external member who is not employed at the University of Split. - Supervisor and co-supervisor cannot be members of the committee. - In the past five years two joint doctorates have been defended successfully (in Cachan, France and in Sweden). - The requirement for being permitted to defend a doctoral thesis is the publication of at least one scientific paper in an international peer-reviewed journal indexed by WoS if the dissertation is written as monograph, or at least three papers if the thesis is written in accordance with the Scandinavian model. <p>-The Panel believes that the obligation of publishing one international peer-reviewed journal is a commendable requirement, indicative of the appropriate quality threshold for doctoral research.</p>
<p>2.8. The HEI publishes all necessary information on the study programme, admissions, delivery and conditions for progression and completion, in accessible outlets and media.</p>	<p>High level of quality The Panel noted that all information is published on the Faculty 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 successfully).</p>	<p>High level of quality The Panel was advised that the total tuition fee for full-time study at the Faculty is 48,000.00 HRK, and 60,000.00 HRK for part-time study.</p> <p>The Faculty advised the Panel that FCAEG covers the expenses of its employees and that 28 of 40 candidates who have been awarded the degree of PhD since 1996 were junior researchers and became assistant professors in the Faculty. A further 4 candidates became junior researchers at other HEIs. The Panel was advised that 8 candidates came from the economy sector, 3 of which later became FCEAG employees.</p>

	<p>The Panel was advised that costs beyond fees (e.g. research equipment, new measurements, travel costs of the supervisor/candidate, attendance of international and domestic scientific conferences, etc.) were covered by funds from the supervisor's research projects.</p> <p>The Faculty advised the Panel that the doctoral study programme in Civil engineering is self-sustainable because the tuition fees cover the basic costs for all external candidates, whereas FCEAG candidates do not need to pay for tuition.</p> <p>-Tuition spending control is conducted on several levels; specifically, the student registration office, the legal and financial department, and the postgraduate doctoral university study committee.</p> <p>The Panel considers that the Faculty has established a system of funding the programme within the institution and through different projects. However, the Panel recommends that the Faculty staff continue to make applications for co-funding of doctoral programmes via governmental and EU initiatives and to establish more international partnerships via, for example, the Newton Fund.</p>
<p>2.10. Tuition fees are determined on the basis of transparent criteria (and real costs of studying).</p>	<p>High level of quality The Faculty advised the Panel that fees are set at the minimal price which enables the study to be self-sustainable and in accordance with accepted norms for UG and PG programmes..</p>
<p>3. SUPPORT TO DOCTORAL CANDIDATES AND THEIR PROGRESSION</p>	
<p>3.1. The HEI establishes admission quotas with respect to its teaching and supervision capacities.</p>	<p>High level of quality In discussions with staff and from reading the SER, the Panel noted the following:</p> <ul style="list-style-type: none"> -The obligations of supervisors and co-supervisors, candidates and research teams are clearly defined. -After the discussion with the mentors, the panel found that most supervisors dedicate 5 contact hours per week and that the ratio of teaching; research is about (50:50). -In general, the 3 candidates per supervisor criterion was satisfied by the programme. - The Faculty holds a competition to select the best candidate to participate in funded projects. The supervisor and the relevant committee select the best candidate. The Panel identified this as good practice.

<p>3.2. The HEI establishes admission quotas on the basis of scientific/ artistic, cultural, social, economic and other needs.</p>	<p>High level of quality</p> <p>The Panel recognised the economic difficulties that the HE sector and construction have both faced in Croatia in recent years. The Panel noted that:</p> <ul style="list-style-type: none"> - the Faculty has provided education for 7 doctors of science from the construction sector in the past 5 years. - Doctors of science who continued their research at the Faculty have undertaken scientific projects and cooperated with the business sector. - In the past 5 years, many projects have been conducted by the Faculty in cooperation with the business sector and were funded by different administrations. <p>The Panel also met two alumni who have started their own engineering business.</p> <p>A meeting with five stakeholders was arranged. The Panel discussed with them how they collaborate with the Faculty. All commented on the good and productive relationships that they hold with the Faculty. Representation included: materials testing laboratory, technical advisor (cement), Electrical Engineering Associate Professor, Civil and Structural Engineering firm, and Croatian Water.</p> <p>The Panel believes that the Faculty has good links with the industry sector in Croatia which enable its students to obtain knowledge and skills while addressing societal needs. The Panel encourages the Faculty to enhance these links.</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>High level of quality</p> <p>The Vice Dean advised the Panel that the recession in the employment of engineers in Croatia has affected the enrolment in the doctoral study programme. Furthermore, the Panel was advised that:</p> <ul style="list-style-type: none"> -The doctoral study programme is open for admission every year. -The usual admission quota is 20 candidates with due consideration to the number of teachers and supervisors. However, the number of applications is usually lower than the number defined by the admission quota. <p>The Panel found that the Faculty has been successful in attracting externally-financed projects (such as the Japanese-Croatian project) and is applying for more funds (such as EU funding) to improve its laboratories. The Panel encourages the Faculty to increase its activities in this area.</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).</p>	<p>High level of quality</p> <p>The Panel was impressed with the way in which the Faculty administers and manages each candidate's research plan and</p>

<p>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>associated learning activities. Specifically,</p> <ul style="list-style-type: none"> -The Panel was satisfied that enrolled students are qualified to carry their research. Most of them are satisfied with the academic experience they are receiving at the Faculty. - The Panel noted that the criteria for the selection of candidates is clear. -The supervisor monitors the candidate’s work through the courses. -A scientific seminar for all candidates is organized every year where each student gives a presentation about his work. The candidates also participate in a national yearly conference. - The supervisor and the candidate jointly define courses the candidate is required to pass during the first preparatory year. - The doctoral study committee and Faculty council monitor supervisor’s and candidate’s work through their annual reports.
<p>3.5. The HEI ensures that interested, talented and highly motivated candidates are recruited internationally.</p>	<p>The Panel noted that</p> <ul style="list-style-type: none"> - The selection of candidates for enrolment in the study programme is done by the doctoral study committee and based on the ordinance of the postgraduate doctoral study. -A motivation letter or an interview is required for the enrolment in the study programme. <p>-From discussions with staff, it was clear to the Panel that the call for applications for the PhD programme does not attract international students. The Panel recommends that the programme be advertised not only in the University website but through international websites such as (www.findaphd.com) and (www.phdportal.eu). Also online interviews should be undertaken for foreign applicants.</p>
<p>3.6. The selection process is public and based on choosing the best applicants.</p>	<p>Improvements are necessary</p> <p>Interviews with staff and reading the SER led the Panel to understand that:</p> <ul style="list-style-type: none"> - Invitation for the admission of new candidates for the postgraduate study is usually published once a year and is open for 30 days. - Candidates’ evaluation criteria include GPA above 3.5, published paper based on the quality graduation thesis, motivation letter, and three letters of recommendation from professors/researchers. Candidates are only interviewed in the event that letters of recommendation are insufficient. <p>The Panel found that due to the limited number of applicants, the required GPA may be decreased.</p> <p>The Panel recommends that potential applicants should be interviewed before being offered a place to study.</p>
<p>3.7. The HEI ensures that the selection procedure is transparent and in line with</p>	<p>High level of quality</p> <p>The Panel was impressed with the Faculty’s selection procedure,</p>

<p>published criteria, and that there is a transparent complaints procedure.</p>	<p>finding it to be transparent and clear. Specifically,</p> <ul style="list-style-type: none"> - The invitation for admission to the University doctoral study programme is publicly announced in daily newspapers and on the Faculty website (although note comment above regarding advertising enhancements).. -Candidates are informed of their rights and obligations and the possibility of filling a complaint against the admission decision. - The entire application, enrolment and complaints procedure is given to the candidates in writing. - Candidates who do not meet the admission requirements are entitled to an explanation as to why they were not admitted.
<p>3.8. There is a possibility to recognize applicants' and candidates' prior learning.</p>	<p>Improvements are necessary</p> <p>The Panel was advised that:</p> <ul style="list-style-type: none"> - The supervisor analyses the candidate's previously acquired learning outcomes at the graduate study and other (commenced or completed) doctoral programme, published scientific papers etc. - The supervisor then determines the courses with the candidate in the first preparatory year by selecting the overall volume not less than 60 ECTS. <p>The Panel recommends that the Faculty considers reducing the number of classes to be taken by PhD students to allow more concentration on the research topic. Topics that would have been addressed via taught material will still be covered by candidates as appropriate, but via blended learning and on-the-job training, rather than specific taught courses. The Panel believes this would have a significant effect on the completion rate.</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>Improvements are necessary</p> <p>The Panel was satisfied that the Faculty meets its obligations in line with University ordinances. Specifically,</p> <ul style="list-style-type: none"> - The ordinance of the postgraduate University (doctoral) study of Civil engineering presented by FCEAG describes the rights and the obligations of the candidate, which is made publicly available, and the study programme and study syllabus. - The candidate signs a statement with the selection of the study type, the type of payment and the studying contract. <p>The Panel suggests that the Faculty considers increasing the frequency of reporting on PhD candidates' performance beyond the annual report, so that poorly-performing students can be identified sooner with increased likelihood of successful adjustment. This can be achieved relatively easily by creating an online system where mentors and students are required to keep written records of monthly meeting and progression of the research work.</p>

<p>3.10. There are institutional support mechanisms for candidates' successful progression.</p>	<p>Improvements are necessary The Panel was advised that</p> <ul style="list-style-type: none"> - All candidates employed at the Faculty receive financial rewards for publishing scientific papers. - The Faculty does not require tuition payment from its candidates. - The Faculty has released from payment all of its excellent students who attended professional training in the past five years. <p>-A significant part of the doctoral study research has been financed from domestic and international competitions for scientific and professional projects.</p> <ul style="list-style-type: none"> -The Faculty enables its candidates to use all laboratories and computer resources within the institution. -Doctoral candidates have written 103 scientific papers for the period 2011-2015. -Doctoral candidates, who are also Faculty employees (35 candidates), receive direct financial support from the Faculty, as they are released from tuition payment. -Research of all candidates (59 candidates) is also financed from Faculty funds, directly or via projects in which they cooperate. <p>-The Panel recommends that the Faculty considers increasing the mobility of its students internationally; for example, a minimum of three-month secondment at an alternative international institution could be introduced.</p>
<p>4. PROGRAMME AND OUTCOMES</p>	
<p>4.1. The content and quality of the doctoral programme are aligned with internationally recognized standards.</p>	<p>High level of quality The Panel assessed the quality of the programme based on the SER and the interviews.</p> <p>The Panel found that the programme facilitates interdisciplinary activities through research and attending classes at any constituent of the University or other institutions. Candidates are able take up to 18 ECTS credits outside the study programme, and there is a possibility of increasing this beyond 18 ECTS. 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>There are Joint Doctoral Degrees, where candidates attend classes and conduct research simultaneously at home and at other faculties or universities. Two (2) candidates of the Faculty's doctoral study programme have conducted research based on the Joint Doctoral Degrees contracts.</p> <p>The Faculty has on-going collaborations with several researchers at European and worldwide universities.</p>

	<p>The Doctoral study programme is similar to those of the Delft University of Technology, Netherlands, and KTH Royal Institute of Technology, Sweden. The postgraduate study at both KTH and TU Delft universities, which include research at least three-year and a number of ECTS credits, is very similar to the study programme at FCEAG.</p> <p>The programme duration for a full-time equivalent is similar in comparison to international standards (three years in the UK, four years in Sweden in which one year is for reading course). The ratio between teaching and research 1:3 is similar to the Scandinavia model. The number of course to be taken at the doctoral study programme at FCEAG is 60 ECTS which is equivalent to one year full-time study.</p> <p>The Dissertation Defence procedure is also similar to the practice at KTH.</p> <p>The types of doctoral thesis can be a traditional scientific monograph or a collection of published scientific papers (Scandinavian model). Most of the doctoral thesis are written in Croatian and some are in English.</p> <p>The Panel overall judgement is that the content and quality of the doctoral programme to be high quality for it provides for at least three years of independent research experience. The doctoral study programme requires no less than three years of scientific research for full-time students, and defending the doctoral thesis after having met all the requirements.</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>High level of quality</p> <p>The Panel was pleased to note that learning outcomes of the doctoral study programme and each of the courses are clearly defined. The process of monitoring the achievement of intended learning outcomes and candidates' performance is clear. At the preparatory year, the CroQF level 7 learning outcomes necessary for research are acquired. Learning outcomes are also clearly defined for competences of planning, writing and reporting skills, as well as other generic competences.</p> <p>Candidates acquire competences in making a hypothesis, presentation and elaboration of research work, review and critical analysis of own and other research work through the study years. Each candidate is also expected to write, present and provide well defined arguments for their results, communicate arguments to the colleagues and be able to make inferences, data illustration etc.</p>

	<p>The peer review requirement where students reviews other student’s paper at the doctoral study, teaches them to critically review and assess research work. The Panel found that this is a very good experience.</p> <p>The compulsory course “Methodology and Techniques of Research Work” provides basic and transferable skills. The course also covers ethical dimension. Doctoral candidates are encouraged to participate in preparation of research project proposal and project application, through which candidates get awareness on research ethics and social responsibility for successful execution of research, socially beneficial results and potential social consequences.</p> <p>The Panel concludes that the study programme is of high quality and the learning outcomes at the different levels are well described.</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>The Expert Panel assessed the SER and held interviews with candidates and alumni. The Panel concludes 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>High level of quality</p> <p>The Panel examined the SER and found that to provide an illustration of the relationships between the doctoral study learning outcomes and level 8 learning outcomes.</p> <p>The quality assurance procedure was clearly stated and this includes that the candidate being monitored by their supervisor from the preparatory year to the defence of the dissertation. The candidate is also required to present papers within the study to demonstrate their ability to manage scientific-research activities and devotion to the development of new ideas. The student demonstrates his/her personal autonomy and responsibility required at that level of education as part of the quality assurance procedure.</p> <p>The Panel also scrutinized samples of dissertations, and samples of published and seminar papers. The Panel found that the published papers and the theses are of high quality and in similar standard to other international HEIs and was satisfied that this ensures the quality and level of achieved learning outcomes.</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>High level of quality</p> <p>The Panel was advised that most of the doctoral-level teaching is delivered through individual consultation and through seminar papers, the topics of which are selected from the candidates’ interest areas. Ex-cathedra classes are generally avoided and already in the preparatory year the student is directed towards</p>

	<p>research through the composition of papers, seminars etc. Once each year, the Faculty holds a scientific seminar to monitor the progress of candidates, and to give the opportunity for candidates to practise presentation skills.</p> <p>The Panel believes that the teaching methods used are at an appropriate high quality level of and are appropriate for achieving intended learning outcomes.</p>
<p>4.6. The programme enables acquisition of general (transferable) skills.</p>	<p>High level of quality The Panel observed that the doctoral study programme provides candidates with generic competences and skills in writing and submission of proposals for scientific projects by participating in the research topic applications such as within Horizon 2020. The programme provides skills in the monitoring of project activities and in participation in the organisation of various conferences and seminars.</p> <p>The Faculty provides opportunities for candidates to develop business competences and to manage knowledge and innovations through participation in workshops for preparing project proposals, patent protection, etc. The Faculty also enables its candidates to acquire generic skills through the exchange programme.</p> <p>The Faculty announces all workshop and available exchange programmes opportunities to all candidates.</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>High level of quality The Panel was advised that all courses are elective except for one compulsory course; "Methodology and Techniques of Scientific Research". Selection of the elective courses is flexible and adapted to each candidate's academic needs and planned research. Each candidate has an individual study plan and the elective courses are selected through a discussion with the supervisor.</p> <p>Candidates are exposed to at least three years of independent research work, during which candidates have the opportunity to undertake a period of study at a different research centre, arranged in consultation with their supervisor.</p>
<p>4.8. The programme ensures quality through international connections and teacher and candidate mobility.</p>	<p>Improvements are necessary Both the Faculty's doctoral study programme candidates and its employees are encouraged to engage with mobility programmes and undertake study periods at other research institutions. Student mobility is particularly encouraged by the Ordinance on Joint Doctoral Degree. Information regarding possibilities for the doctoral student mobility and scholarships for training at foreign universities are available via the University Office for</p>

International Cooperation. However, the Panel observed that the uptake of mobility opportunities is not uniform among the candidates and depends on available project funds and the mentor's international network.

During the interview, the Panel learnt that self-funded students may not have the ability to fund mobility by themselves and there is no formal requirement for this to occur. The Panel believes that the Faculty should consider the introduction of increased mobility of candidates. This could be achieved via offering teaching relief and through provision of funding sources to finance the mobility of candidates.

*** 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.