



agency for science and higher education

**REPORT  
OF THE EXPERT PANEL  
ON THE  
RE-ACCREDITATION OF  
FACULTY OF GEODESY, UNIVERSITY OF ZAGREB**

**Date of site visit:  
15 – 17 May 2018**

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**MAMFORCE**



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## INTRODUCTION

The Agency for Science and Higher Education (the Agency) is an independent legal entity with public authority, registered in the court register, and a full member of the European Quality Assurance Register for Higher Education (EQAR) and European Association for Quality Assurance in Higher Education (ENQA).

All public and private higher education institutions are subject to re-accreditation, which is conducted in five-year cycles by the Agency, in accordance with the Act on Quality Assurance in Science and Higher Education (Official Gazette 45/09) and subordinate regulations, and by following *Standards and Guidelines for Quality Assurance in the European Higher Education Area* (ESG) and good international practice in quality assurance of higher education and science.

The Agency's Accreditation Council appointed an independent Expert Panel for the evaluation of Faculty of Geodesy.

Members of the Expert Panel:

- Professor Christoforos Kotsakis, Department of Geodesy and Surveying, Aristotle University of Thessaloniki, Hellenic Republic, Panel chair
- Professor Irina Artemieva, Department of Geosciences and Natural Resource Management, University of Copenhagen, Kingdom of Denmark
- Professor Tõnu Oja, Department of Geography, University of Tartu, Republic of Estonia
- Assistant Professor Mariana Belgiu, Faculty of Geo-Information Science and Earth Observation, University of Twente, Kingdom of the Netherlands
- Juraj Jurišić, student, Faculty of Civil Engineering, Architecture and Geodesy, University of Split.

During the site visit, the Expert Panel held meetings with the following stakeholders:

- management
- Self-evaluation Report committee
- students
- heads of study programmes
- full-time teaching staff
- assistants and junior researchers
- alumni
- heads of doctoral programmes and leaders of research projects

- representatives of the business sector, potential employers.

The Expert Panel members had a tour of the work facilities, laboratories, library, IT classrooms, student administration office and classrooms, and attended sample lectures, where they held a brief Q&A session with students.

In accordance with the site visit protocol, the Expert Panel examined the available additional documents and study programme descriptions (learning outcomes).

The Expert Panel drafted this Report on the re-accreditation of Faculty of Geodesy on the basis of Faculty of Geodesy self-evaluation report, other relevant documents and site visit.

The Report contains the following elements:

- short description of the evaluated higher education institution
- brief analysis of the institutional advantages and disadvantages
- list of institutional good practices
- detailed analysis of each assessment area, recommendations for improvement and quality grade for each assessment area
- detailed analysis of each standard, recommendations for improvement and quality grade for each standard
- appendices (quality assessment summary by each assessment area and standard, and site visit protocol)
- summary.

In the analysis of the documentation, site visit to the Faculty of Geodesy and writing of the Report, the Expert Panel was supported by:

- Mia Đikić, coordinator, ASHE
- Irena Petrušić, coordinator, ASHE
- Goran Briški, interpreter at the site visit, ASHE
- Marija Omazić, translator of the Report.

On the basis of the re-accreditation procedure conducted, and with the prior opinion of the Accreditation Council, the Agency issues a following accreditation recommendation to the Minister for Higher Education and Science:

1. **issuance of a confirmation on compliance with the requirements** for performing the activities, or parts of the activities
2. **denial of license** for performing the activities, or parts of the activities
3. **issuance of a letter of expectation** with the deadline for resolving deficiencies of up to three years. A letter of expectation can include the suspension of student enrolment within a set period.

The accreditation recommendation also includes a quality grade of a higher education institution, and recommendations for quality improvement.

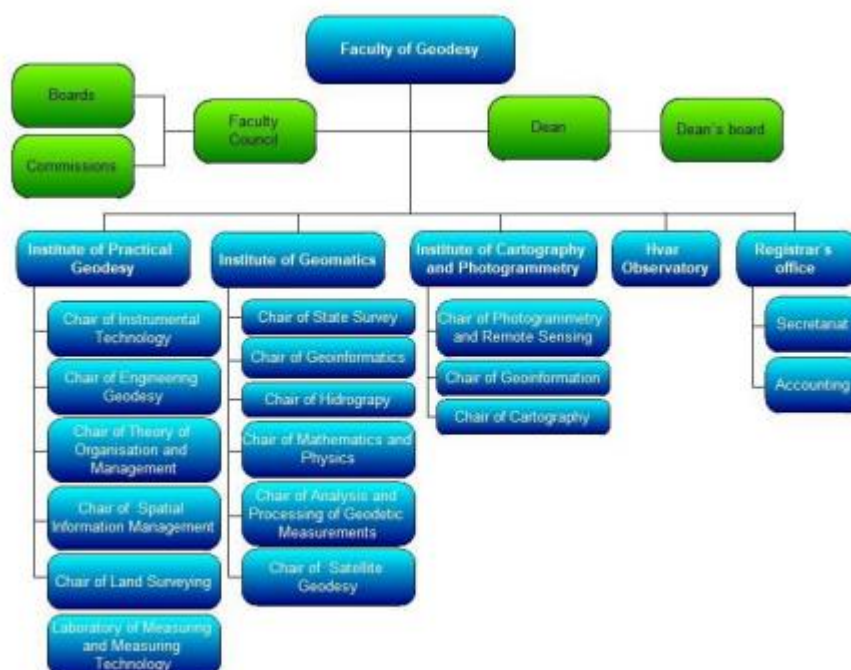
## ***SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION***

NAME OF HIGHER EDUCATION INSTITUTION: Faculty of Geodesy, University of Zagreb

ADDRESS: Kačićeva ul. 26

DEAN: Prof. Damir Medak, PhD

ORGANISATIONAL STRUCTURE:



STUDY PROGRAMMES:

- Geodesy and geoinformatics, undergraduate university study programme
- Geodesy and geoinformatics, graduate university study programme
- Geodesy and geoinformatics, postgraduate (doctoral) university study programme
- Geodesy and geoinformatics, specialist postgraduate university study programme

NUMBER OF STUDENTS: 571

NUMBER OF TEACHERS: 31

## SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION:

Faculty of Geodesy, University in Zagreb is the only higher education institution in the Republic of Croatia offering Bachelor, Master and postgraduate study programmes in the research area of geodesy. Ever since the first geodetic teaching activity was established in 1898 at the Academy of Forestry at the Faculty of Philosophy, the higher education in Croatia has always observed modern trends in the country, as well as in the world due to a successful synthesis of fundamental, and of general and professional knowledge. In the last 15 years, the Faculty of Geodesy has been focusing its development on the synthesis of the areas of geodesy and geoinformation.

The structure of studies and content of teaching make the teaching programme comparable with the programmes of related studies at the prominent European education institutions, which ranks the Faculty among the leading technical faculties at the University in Zagreb and in Croatia.

The Faculty is a holder of modern study programmes in the area of technical sciences intended for the training of professionals who will perform the geodetic and geoinformation - jobs in the field of economy, both in state and public sector. There are four university study programmes offered today at the Faculty: Bachelor, Master, postgraduate doctoral and postgraduate specialist study programmes. Along with the theoretical topics taught by proficient teachers, practical issues are also an important component of education at the Faculty, which is evident from the data about the laboratory, observatory, and from more and more intensive collaboration with the economic sector.

There are somewhat less than 100 employees working at the Faculty, out of which 62 are participating directly in teaching activities (31 teachers and 31 assistants). There are altogether more than 500 students enrolled at the Faculty.

## ***BRIEF ANALYSIS OF THE INSTITUTIONAL ADVANTAGES AND DISADVANTAGES***

### ***ADVANTAGES OF THE INSTITUTION***

1. Very strong and long tradition in teaching geodesy and training of several generations of Croatian surveyors and geodesists.
2. Well-established presence and good reputation within the international geodetic scientific community.
3. Extended experience to providing community service in response to actual needs of maintaining and modernizing the national geodetic infrastructure.
4. Strong links with the Cartographic Society of Croatia and the Geodetic Society of Croatia.

### ***DISADVANTAGES OF THE INSTITUTION***

1. The HEI's long tradition is somewhat breaking the development as it retains a "steady-state" mentality which is slowing down the implementation of required changes.
2. Out-of-focus strategic vision without placing special emphasis to particular quantified objectives to be achieved in mid-term or long-term basis.
3. Insufficient library resources in terms of English geodetic textbooks and international journals.
4. Doctoral students are essentially hired and integrated into the Faculty as teaching assistants – this causes "de-valuation" of the PhD program and creates a significant misbalance of human resources within the Faculty.
5. Post-docs solely originate from the pool of HEI's recent PhD graduates. Instead, "real" post-docs should be attracted from other countries and/or Universities.
6. The time length of the internship student training is too small.

## ***LIST OF INSTITUTIONAL GOOD PRACTICES***

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

1. Regular financial support from the Faculty to graduate students in support of international and national conference participation.
2. Establishment of Alumni Association and joint organization of promoting events.
3. Organization of International Doctoral Seminar in the field of Geodesy, Geoinformatics and Aerospace, Dubrovnik, 2017.
4. Publication of a Faculty-based student journal with informative geodetic-related content.



## ***ANALYSIS OF EACH ASSESSMENT AREA, RECOMMENDATIONS FOR IMPROVEMENT AND QUALITY GRADE FOR EACH ASSESSMENT AREA***

### ***I. Internal quality assurance and the social role of the higher education institution***

#### **Analysis**

The HEI operates an internal Quality Management Committee (QMC) which collaborates with the University management and the Agency for Science and Higher Education. Its role is to develop mechanisms for the quality monitoring and improvement of the Faculty's academic, research and administrative work. The level of development of the quality assurance system in the HEI has been evaluated as partly efficient during the last internal evaluation (see self-evaluation report, p. 18). The HEI has a clearly-stated strategic vision which however lacks focus in terms of particular mid-term/long-term goals. Also, the HEI has recently adopted a strategic plan for the period 2019-2023 which sets the priorities for its future scientific and research work in various areas, and the expected results. Overall, the Faculty of Geodesy seems to be applying considerable effort towards the improvement of its quality assurance system, yet certain improvements are still necessary to be made. The HEI shows good awareness of the required actions that need to be taken for quality improvement in accordance to previous recommendations given in past internal and external evaluations. Out of forty individual recommendations that were provided by the expert-panel committee in the external evaluation of 2012, almost half of them have been (fully or mostly) implemented, whereas the rest still remain to be addressed. It is noted that some previous recommendations which are supposedly fully applied, they still need to be re-addressed in a better and more efficient way. Some of the previous recommendations that are still in their initial implementation phase are rather critical and more accelerating efforts should be taken by the Faculty management for their implementation.

The HEI has been doing a good job in disseminating information about its academic and research activities. Specifically, the Faculty's website provides easy access to study program information (admission procedure and related criteria), the syllabus of its study programmes and their learning outcomes, the cost of studying, other important academic regulations, the research activity and the ongoing international collaborations, organized and planning conferences and summer schools, etc. Also, the HEI is regularly producing special leaflets for promotional purposes, brochure guides for first-year students, anniversary memorial volumes and yearbooks (since 2002) and an annual student magazine. The HEI is actively participating in several other outreach

activities that support and promote its social role and its contribution to a large spectrum of the professional and non-professional community.

### Recommendations for improvement

- Operation of the QMC should be made more formal by organizing regular meetings and providing annual reports to the Faculty Council.
- The HEI's vision and the adopted strategic plan should include more focused objectives. The level of achievement of those objectives should be constantly monitored by the QMC.
- Establishment of an external advisory board in support of the HEI's efforts for academic quality improvement and monitoring.
- The QMC should focus its work on the full implementation of all past recommendations provided by the previous external evaluation results, especially the ones related to promoting academic and research excellence among the faculty members, and also the ones related to enhancing and strengthening the international academic profile of the Faculty of Geodesy.
- Plagiarism checking needs to be implemented in a systematic automated way.
- Publicize the employability of former students since it seems to be at a very satisfactory level. The information about student employability that reaches the stakeholders seems to be updated only up to 2014.
- Provide outgoing Erasmus students with promotional material to advertise the Faculty of Geodesy throughout Europe. Also, organize outreach activities in secondary schools to attract and recruit high-profile students to the Faculty.

### Quality grade

Satisfactory level of quality

## II. *Study programmes*

### Analysis

The goals of the academic study programs offered by the Faculty of Geodesy are aligned to those specified in: (a) the education strategy of the University of Zagreb, (b) the Strategy of Innovation of the Republic of Croatia 2014-2020 and (c) the Strategy of Research, Technology Transfer and Innovation of the University of Zagreb. The HEI justifies its study programs by taking into account the students demand and, to a certain extent, the situation on the national labour market. Various professional organizations that are strongly tied with the Faculty are also consulted for the quality assurance of the

learning outcomes. There is clear evidence that the Faculty produces competitive professionals in Geodesy and Geoinformatics for the domestic labour market. However, there is less evidence on their competitiveness on the international labour market. Statistics on the graduates' employment is provided, however there is no information on the economic sectors where the graduates are working. The HEI participates in an ERASMUS Sector Skills Alliances project ('EO4GEO-towards an innovative strategy for skills development and capacity building in the space geo-information sector') which offers the possibility to align the learning outcomes of the Geoinformatics study program (Master Study Program of Geodesy and Geoinformatics) to the European Qualifications Framework (EQF).

The regulations on studying and grading put into practice by the Faculty are described in a clear and transparent manner. The HEI defines the competences at the level of the study programs to a certain degree, but they are not entirely covered by the available pool of courses. Furthermore, the feedback collected from the students on the defined competences showed that improvement is still required. The HEI puts into practice both formal (questionnaires) and informal (discussion with the students at the end of the course) mechanisms for gathering students' feedback on the achievement of the intended learning outcomes. However some of the defined learning objectives are neither specific enough nor measurable. Therefore, it is difficult to assess whether these objectives are accordingly evaluated, i.e. whether the assessment methods are aligned to the defined learning objectives and teaching methods. Faculty members reported that they are improving the content of their teaching materials by taking into account the latest technological developments. There is, however, no explicit evidence that the student's feedback is also taken into account for quality assurance of the developed learning material. Students have four examination possibilities for each course. This practice does not necessarily improve their performance but it rather postpones their study efforts. Furthermore, according to the feedback collected during the organized site visits, most teachers feel overloaded by the preparations required to organize the exams.

The HEI made some efforts towards improving the ECTS allocation during the last years. However, according to the students' polls conducted between February and March 2018 for the Master Study Program, the ECTS are not appropriately allocated to the vast majority of the offered courses, including both mandatory and elective courses. The HEI includes compulsory professional practice into the academic curriculum. However, the practice period is too short (two weeks) to permit students adequate development of practical skills which might increase their competitiveness on the labour market. Undergraduate students have more practical activities in the third study year, but these activities seem not to be sufficient during the first two years.

Finally, the HEI is active in offering Lifelong Learning Programs either through a postgraduate specialist study programme or a pool of courses available for the Croatian Chamber of Chartered Engineers of Geodesy. There is no evidence on how the quality of offered courses is evaluated. Furthermore, there is no information on the learning outcomes, skills, and competences acquired by the participants. The learning methods are not clearly described and there is no information on the software used to teach the intended methods and technology. The postgraduate specialist study programme has a very low number of participants.

### Recommendations for improvement

- HEI should improve the statistics on the employability rate of the graduates.
- HEI should put extra efforts in covering all competences defined for all offered study programs.
- Teaching staff needs training in defining more specific and measurable learning objectives and aligning these objectives to the assessment and teaching methods. The HEI needs to organize or to offer teachers the possibility to attend pedagogical training courses to help them better allocate ECTS credit based on student workload and, therefore, to better design and re-design the learning materials.
- The role of the Committee for Quality Management in the revision of learning objectives should be better defined.
- The number of examination opportunities should be reduced. This might improve the learning performance of the students while reducing the resources (financial resources and time) required for preparing the exams.
- HEI should put more efforts in increasing the participation of the students in filling out the evaluation forms designed to collect information on the delivered education.
- It is recommended to extend the period for professional practice by taking advantage of HEI's strong connections with the industry and State agencies.
- HEI should provide on their website a clear description of the intended learning outcomes, the content of the offered course, competences and skills acquired by the course participants. Furthermore, the Alumni network could be better involved to update the list and content of the offered lifelong learning courses.
- Given the small number of students enrolled in the postgraduate specialist study programme, the HEI should evaluate the strengths and weakness of this program and decide its continuation or cessation.

## Quality grade

### Satisfactory level of quality

### **III. Teaching process and student support**

#### Analysis

The HEI clearly defines and publishes online the academic criteria and related regulations for its study programmes. The criteria for admission to master-level studies from candidates who have adequately completed the bachelor-level study programme are also provided transparently. Recognition of exams when transferring from one HEI to another is given by the ECTS coordinator. Data about the students' academic success and progress throughout their studies based on ISVU system is regularly collected and analysed by the vice dean for academic and students affairs. Analysis reports are regularly given to the teaching board and to the members of the Faculty Council. In order to increase exam pass rates some classes were changed from obligatory to optional. Examination periods in the form of 2+2 weeks force students to have 2-3 exams in a very short period of time, which may cause low pass rates (especially on first and second year of bachelor study).

HEI's academic programme is delivered through different types of teaching activities. The Faculty allows students to become familiar with modern surveying instruments and related methodologies. Students can attend some optional course units in other academic study programmes so that they can expand their knowledge in new directions. Furthermore, HEI encourages and rewards student excellence with several types of academic awards (Dean's award, Rector's award, etc.).

The HEI operates an administration office for student affairs which provides information and support to all students for academic matters related to their studies. Guided counselling on studying and career opportunities are provided by the Study Advisors and the vice Dean for academic and student affairs. In general, the students are well informed about their rights and the available support. Consultation hours are defined clearly and published online. The availability of the HEI' teaching staff for student consultation seems to be at a very satisfactory level.

The HEI doesn't currently have any students with disabilities. There also no students who are declared as persons from vulnerable or disadvantaged groups. Yet, all the premises of Faculty of Geodesy have been designed to accommodate any needs for students with mobility disadvantages. Occasional issues related to vulnerable students are always resolved in favour of students, in the sense that the teaching and the course

assessment process can be adjusted to the individual needs of students from vulnerable groups. There is an advisor for disadvantaged students operating at the faculty level.

Students are well informed about academic mobility options in the frame of Erasmus+ and Ceepus international study programmes, which are coordinated by the HEI's ECTS coordinator. The student interest for international mobility seems to grow higher every year, which is clear evidence that the HEI promotes these programmes in an effective way. Teachers are not obligated to deliver course material and classes in English - only six courses are optionally provided in the English language. The incoming mobility of students to the Faculty of Geodesy is much smaller compared to the outgoing student mobility. The main reason is that the usage of English language is not stimulated and encouraged in the Faculty. It is indicative that the number of English geodetic textbooks and scientific journals in the library is exceptionally small. Foreign students can take Croatian language courses only at the University level.

The Faculty teachers use clear criteria for their grading methods. The students' comments during the site visit on the grading methods and their application, including the feedback on the evaluation results, assured that course grading is adequate. The criteria and methods used are aligned with the teaching methods in place. Special needs of students are taken into account if needed. Pedagogical education of the teaching staff members was not ascertained. Evaluation of grading is not absent but could be more systematic.

### Recommendations for improvement

- The prospective number of exams for each semester course that the students can attend in one academic year should be decreased from 4 to 2. The exams must be spread logically during the examination period. These changes would raise the academic responsibility in the student body and improve their attitude towards their studies.
- Professional practice gained by students outside the Faculty of Geodesy should be expanded (currently it covers only a two-week period) so that the students can get a better feeling of what is going on in the labour market.
- There are certain critical issues concerning the operation of HEI's library that should be improved (detailed recommendations on this aspect are provided in section 4.6).
- Flexibility between Croatian – English language should be increased. The HEI should encourage and support the increase of the international mobility of its students.

- Actions need to be taken to increase the incoming student mobility, especially the number of classes that can be delivered in English. Accordingly, the library needs to be significantly enriched in terms of English textbooks and journals.
- Career days and professional job fair could be possible undertakings to further develop the relations between the Faculty and the students.

### Quality grade

Satisfactory level of quality

## ***IV. Teaching and institutional capacities***

### Analysis

HEI teaching capacities are satisfactory. However, this is achieved through employment of too many PhD students who do not have any pedagogical preparation and their teaching load is too large and leaves them insufficient time for PhD study.

HEI follows the national regulations in academic staff recruitment. However, HEI has no high-profile international academic employees.

HEI follows the national regulations in re-appointment procedure. However, presently HEI has disproportion in the ratio of senior to junior academic staff.

Teaching personal is knowledgeable and dedicated at all levels. However, teaching excellence is not rewarded, and there is disproportion in the level of support of different courses.

HEI participates in some international projects with a very limited funding and encourages participation of teaching and research staff in national and international conferences by waving their conference fees. However, outside conference activities, international mobility of teaching staff is not at the level of international high-profile institutions.

Scientific productivity and the publication level of both permanent and temporary teaching staff is very low by international standards.

HEI has a well-developed infrastructure for providing professional teaching and work environment. However, the instrument pool is mostly old and with a limited amount of recent acquisitions.

Library is hosted in a spacious user-friendly hall, students have access to the library over a broad time frame, and have assistance of a professional librarian. However, the number of book shelves is far too small to accommodate the amount of professional literature expected for a high profile HEI. Recent titles in geodesy and geoinformatics

are nearly absent, and systematic collection of professional and teaching books does not exist. Nearly all titles in geodesy and geoinformatics are in Croatian.

HEI has access to electronic professional library resources. However, printed versions of professional journals in geodesy, geoinformatics and related disciplines are nearly absent.

HEI is transparent in providing major information on its income and expenditures. However, the budget is unbalanced for both income and expenditures. Very limited effort is made to raise independent funding from competitive sources.

### Recommendations for improvement

- To bring teaching capacity to proportion by decreasing teaching load of PhD students.
- To place strong focus on academic excellence in new appointments and increase the number of international high-profile staff at all levels.
- To increase the number of tenured junior academic staff. To increase the number of scholarships to attract a high-profile academic personnel at all levels, starting from PhD;
- To increase international mobility of teaching and research staff, in particular for long-term stays;
- To ensure that all personal involved in teaching has formal obligatory pedagogical preparation.
- To develop and implement strategy for motivation, promotion, and rewarding excellence in both teaching and research, starting from a student level;
- To increase success rate in applications to national and international science agencies by bringing the scientific level of the academic personal to the international competence level; To increase scientific visibility of HEI through an increased number of publications by all staff categories in high-ISI international peer-review journals;
- To extend and expand international professional network to boost HEI involvement into international small-scale and EU-scale academic and business funding options; To boost national activity in private and in state sector, involving ALUMNI where possible, to increase funding from these sectors;
- To develop budget strategy for external funding, in particular regarding the maximum allowed budget for the applicant's personal salary, HEI overheads, budget for instrument pool, etc.
- To involve international high-profile experts in teaching at all levels, from undergraduate to professional and involve them in PhD co-supervision. Also, to



establish regular seminars with participation of junior academic staff and graduate students.

- To develop strategic plan for renovation and acquisition of the geodetic instrument pool, to increase efforts for getting external funding, and to develop a closer cooperation with ALUMNI “AMCA-Geof” which is open to help with instrumentation.
- To develop strategic plan for new systematic and regular library acquisitions. To increase significantly the diversity of titles of professional literature in the library through a systematic campaign. To develop closer cooperation with ALUMNI “AMCA-Geof” which is open to help with new acquisitions and donations to the HEI library;
- To increase significantly the amount of professional literature in English, both books and textbooks; to ensure subscriptions to leading high-ISI international professional journals; to foster development of the electronic library of major international professional books.

### Quality grade

#### Minimum level of quality

## ***V. Scientific/artistic activity***

### Analysis

There is obvious evidence of internationally published research, some of it considerably high quality. Still, it could be somewhat higher in quantity and significantly higher in selection of journals where to publish – the list of journals in the self-analysis report is quite dominated by the Croatian journals with not so high international impact (not very attractive, available for limited number of readers due to language). The discussions during the site visit still brought out the problem that it is possible to advance in career without significant research achievements. It is left on the researcher. Which is good (research is something related to personal curiosity) and problematic (if your position assumes research and there are no sufficient mechanisms to influence motivation to do so) at the same time.

Professional research of the faculty is well accepted in the society/state. The status of geodesy is high. There is clear evidence of usage of professional knowledge of the faculty in solving practical / applied needs of the society.

There is clear evidence of transfer of knowledge, like lifelong learning programmes and participation (also in cooperation with the Society of Geodesy and chamber of Geodesy) in professional upgrade training.

There is very clear evidence of high recognition of achievements on regional /national level. International recognition could be better although there are appreciable undertakings towards that.

There is evidence of following the tradition which grants certain sustainability (keeping the level) but not necessarily further development.

Due to extremely high rate of internal advancement in the renewal model of the faculty staff and shortage of the impact of internationally acknowledged research on development, the faculty is vulnerable and not very much development-oriented.

There is obvious evidence of research results being involved in improvement of teaching.

#### Recommendations for improvement

- More flexible rewarding for excellence (initiatives are there at the faculty but not motivating enough, they should be reasonably developed and implemented).
- More attention could be paid to receiving international recognition.
- Wider publishing in high impact international journals would make the faculty more visible.

#### Quality grade

Minimum level of quality

## **DETAILED ANALYSIS OF EACH STANDARD, RECOMMENDATIONS FOR IMPROVEMENT AND QUALITY GRADE FOR EACH STANDARD**

### ***I. Internal quality assurance and the social role of the higher education institution***

#### **1.1. The higher education institution has established a functional internal quality assurance system.**

##### **Analysis**

In 2012 the HEI established a Quality Management Committee (QMC) which operates in an advisory role under the auspices of the Faculty Council and the Dean. The QMC collaborates with the University management and the Agency for Science and Higher Education, and it develops and coordinates operational internal mechanisms of quality monitoring and improvement of the Faculty's academic, research and administrative work. Although the QMC seems to be active over the last years in a series of activities related to quality assurance, the level of development of the quality assurance system in the HEI has been evaluated as partly efficient during the last internal evaluation (see self-evaluation report, p. 18). The HEI has also a clearly-stated strategic vision which however lacks specific focus as it does not contain particular mid-term/long-term goals, nor does it exemplify the quantification of such future goals. The HEI has recently adopted a strategic plan for the period 2019-2023 which sets the priorities for its future scientific and research work in related areas, and the expected results. Overall, the Faculty of Geodesy seems to be applying considerable effort towards the improvement of its quality assurance system, yet certain improvements are still necessary in accordance to the following recommendations.

##### **Recommendations for improvement**

- Operation of the QMC should be made more formal by organizing regular meetings and providing annual reports to the Faculty Council.
- The HEI's vision and the adopted strategic plan for mid-term and long-term implementation should include more focused objectives. The level of achievement of those objectives should be constantly monitored by the QMC.
- Surveys of former students is a useful tool which needs to be applied on a more regular basis, possibly with the help of the Alumni Association (AMCA-Geof).
- Establishment of an external advisory board in support of the HEI's efforts for academic quality improvement and monitoring.

##### **Quality grade**

Satisfactory level of quality

## **1.2. The higher education institution implements recommendations for quality improvement from previous evaluations.**

### **Analysis**

The HEI shows good awareness of the required actions that need to be taken for quality improvement in accordance to previous recommendations given in past internal and external evaluations. Since 2013 there have been some action plans and related activities at the Faculty level towards the implementation of those recommendations. Out of forty individual recommendations that were provided by the expert-panel committee in the external evaluation of 2012, almost half of them have been (fully or mostly) implemented, whereas the rest still remain to be addressed and/or applied, although a large time period was available for their effective implementation so far. It is rather unclear from the self-evaluation report which additional steps and proactive actions have been already adopted, at the Faculty level, towards this direction after 2015.

It is noted that some previous recommendations which are supposedly fully applied, they still need to be re-addressed in a better and more efficient way, as it has been concluded from the panel members after their meetings with the Faculty management, the professors and the students during the site visit (see self-evaluation report, Table 1.1, p. 23, recommendations 1.2, 2.1, 5.1). Some of the previous recommendations that are still in their initial implementation phase are rather critical and more accelerating efforts should be taken by the Faculty management for their implementation, see recommendations 4.3, 5.3, 6.4 in Table 1.1 of the self-evaluation report.

### **Recommendations for improvement**

- The HEI's Quality Management Committee should focus its work on the full implementation of all past recommendations provided by the previous external evaluation results, especially the ones related to promoting academic and research excellence among the faculty members, and also the ones related to enhancing and strengthening the international academic profile of the Faculty of Geodesy.

### **Quality grade**

Minimum level of quality

### **1.3. The higher education institution supports academic integrity and freedom, prevents all types of unethical behaviour, intolerance and discrimination.**

#### **Analysis**

There is an Ethical Committee at the Faculty level which operates under the “Ethical Code” of the University of Zagreb. Since 2017, the Ethical Committee has implemented the issuance of “Statements of Originality” related to promotional procedures of the Faculty staff and the preparation of students’ thesis work at the graduate, doctoral and specialist study programme. This is the only available mechanism that is currently used in the HEI for checking scientific and professional plagiarism. Based on the information provided in the self-evaluation report, it is also noted that a rather rigorous and transparent procedure exists for cases where disciplinary procedures need to be initiated by the Dean of the Faculty (this is related mostly to student appeals). Support services for students from vulnerable and under-represented groups are mostly provided at the University level – a corresponding advisor exists also at the Faculty level.

#### **Recommendations for improvement**

- Urgent – plagiarism checking needs to be implemented in a systematic automated fashion using appropriate software tools at all levels of students’ academic activity (purchasing of suitable software is underway according to the Faculty administration).

#### **Quality grade**

Satisfactory level of quality

### **1.4. The higher education institution ensures the availability of information on important aspects of its activities (teaching, scientific/artistic and social).**

#### **Analysis**

The HEI has been doing a very good job in relation to this particular standard. The Faculty’s website provides easy access to: (i) study program information such as the admission procedure and related criteria, syllabus of study program and learning outcomes, cost of studying, important academic regulations, student advisors, profile of most successful students, (ii) research activity information including ongoing research programs, international collaborations, organized conferences and summer schools, other guest lectures, (iii) quality assurance documents, (iv) other Faculty-related documents such as Faculty decisions, Faculty meeting minutes, etc., (v) topical news and information in the field of Geodesy and the geodetic profession, including job

vacancies. Also, the HEI has produced, or is regularly producing, special leaflets for promotional purposes, brochure guides for first-year students, anniversary memorial volumes and yearbooks (since 2002) and an annual student magazine. In addition, the Faculty's Student Council has established regular communication platforms with the student body (email, e-learning, Facebook) to disseminate useful and important information related to their studies and life in Zagreb. The HEI is also actively participating in several other outreach activities (Festival of Science, Scientific picnic, Open Door Days) and cooperates on a regular basis with Technical Geodetic Schools in Croatia through the organization of professional workshops (22 lectures given in 4 workshops up to now).

### Recommendations for improvement

- Limited availability of the Faculty's web content in English.
- Publicize the employability of former students since it seems to be at a very satisfactory level - according to the information provided to the Expert panel. The information about student employability that reaches the stakeholders seems to be updated only up to 2014.
- Provide outgoing Erasmus students with promotional material to advertise the Faculty of Geodesy throughout Europe.
- Organize outreach activities in secondary schools to attract and recruit high-profile students to the Faculty.

### Quality grade

Satisfactory level of quality

## **1.5. The higher education institution understands and encourages the development of its social role.**

### Analysis

There seems to be a strong active participation of the Faculty of Geodesy to several activities that support and promote its social role and its contribution to a large spectrum of the professional and non-professional community. A non-exhaustive list of such activities includes:

- (a) the provision of expert service for highly demanding technical projects at national level,
- (b) the collaboration with local and international geodetic surveying companies in various scientific projects,
- (c) the organization of a large number of map exhibitions since 2012,

- (d) the organization of several important events such as the European Space Expo (2015), the European Day of Geodesy and Geoinformation (2015), and the International GIS Summer School (2014),
- (e) the launch of the web-based journal “Space Journal” with the goal to inform a wide audience about space-based geodetic technologies and their impact to societal needs,
- (f) the operation of several lifelong learning programmes for training purposes of professional geodesists and surveyors within the scope of the Croatian Chamber of Chartered Surveyors,
- (g) the founding of the Croatian Association of former students and friends of the Faculty of Geodesy in 2015,
- (h) the organization of various international events (doctoral seminars) for geodesy students by the Student Council of the Faculty of Geodesy,
- (i) the large number of social activities organized by the HVAR research laboratory in relation to science popularization, and other related science-promotion events for high schools and the general public.

#### Recommendations for improvement

- Keep up the good work!
- Stronger efforts should be pursued to improve and systematize the cooperation with the Faculty’s alumni association.

#### Quality grade

High level of quality

## *II. Study programmes*

**2.1. The general objectives of all study programmes are in line with the mission and strategic goals of the higher education institution and the needs of the society.**

### **Analysis**

The HEI aligns the goals of all offered study programs to those specified in the education strategy of the University of Zagreb, to the **Strategy of Innovation of the Republic of Croatia 2014-2020** and the **Strategy of Research, Technology Transfer and Innovation** of the University of Zagreb. It is also claimed that the Faculty of Geodesy aligns its activities with the Internationalization Strategy of the University of Zagreb 2014-2025. However, more efforts towards the realization of the internationalization objective are required.

The HEI justifies delivering the study programs by taking into account the students demand and, to a certain extent, the situation on the national labour market. There is clear evidence that the Faculty produces competitive professionals in Geodesy and Geoinformatics for the domestic labour market. However, there is less evidence on their competitiveness on the international labour market.

Statistics on the graduates' employment is provided. However, there is no information on the economic sectors/domains where the graduates are working. Furthermore, the information on employability rate available in the English version of the study programs description was not updated since 2013.

### **Recommendations for improvement**

- HEI should improve the statistics on the employability rate of the graduates. The needs of society and situation on the labour market used to justify the enrolment quotas need to be updated. In this way, the Faculty assures that the number of enrolled students increases not only based on the availability of premises and teacher resources, but also on the true needs of the society.

### **Quality grade**

Satisfactory level of quality



## **2.2. The intended learning outcomes at the level of study programmes delivered by the higher education institution are aligned with the level and profile of qualifications gained.**

### **Analysis**

The learning outcomes are aligned with the mission and goals of the HEI. Furthermore, efforts were made towards aligning the learning outcomes of individual course units to the overall learning outcomes of the offered study programs. Various professional organizations, with which the Faculty has strong connections, are also consulted for quality assurance of the learning outcomes. The HEI participates in an ERASMUS Sector Skills Alliances project ('EO4GEO-towards an innovative strategy for skills development and capacity building in the space geo-information sector' project) which offers the possibility to align the learning outcomes of the Geoinformatics-related study program (Master Study Program of Geodesy and Geoinformatics) to the European Qualifications Framework (EQF).

The qualification in Geodesy is listed in the register of the Croatian Qualifications Framework, whereas the qualification in Geoinformatics offered by the Master Study Program of Geodesy and Geoinformatics is still pending.

The regulations on studying and grading put into practice by the Faculty are described in a clear and transparent manner. The HEI defined the competences at the level of the study programs to a certain degree, but they are not entirely covered by the available pool of courses. Furthermore, the feedback collected from the students on the defined competences showed that improvement is required.

### **Recommendations for improvement**

- The HEI should put extra efforts in covering all competences defined for all offered study programs. For example, the Teaching Board should better coordinate the activities related to defining the competences and how they are linked to the available courses catalogue.

### **Quality grade**

Satisfactory level of quality

### **2.3. The higher education institution provides evidence of the achievement of intended learning outcomes of the study programmes it delivers.**

#### **Analysis**

The HEI puts into practice both formal (questionnaires) and informal (informal discussion with the students at the end of the course) mechanisms for gathering students feedback on the achievement of the intended learning outcomes. Some of the defined learning objectives are neither specific enough nor measurable. Therefore, it is difficult to assess whether these objectives are accordingly evaluated, i.e., whether the assessment methods are aligned to the defined learning objectives and teaching methods. Faculty members reported that they are improving the content of their teaching materials by taking into account the latest technological developments. There is, however, no explicit evidence that the student's feedback is also taken into account for quality assurance of the developed learning material.

Students have four examination possibilities for each course. Increasing the number of examinations does not necessarily improve their performance, but it rather postpones their study efforts. Furthermore, according to the feedback collected during the organized site visits, most teachers feel overloaded by the preparations required to organize the exams.

#### **Recommendations for improvement**

- Teaching staff needs training in defining more specific and measurable learning objectives and in aligning these objectives to the assessment and teaching methods. Therefore, the Faculty should organize pedagogical training sessions or should offer the teaching staff possibilities to attend specialized educational course organized by other HEIs or centres of expertise in learning and teaching.
- The role of the Committee for Quality Management in the revision of learning objectives should be better defined.
- The number of resits/examinations opportunities should be reduced. This might improve the learning performance of the students while reducing the resources (financial resources and time) required for preparing the exams.
- As already mentioned above, the HEI uses questionnaires to gather students' feedback on the delivered education. The recommendation is to exploit better the information collected from these questionnaires for improving the learning materials according to the students' feedback.

## Quality grade

Satisfactory level of quality

**2.4. The HEI uses feedback from students, employers, professional organizations and alumni in the procedures of planning, proposing and approving new programmes, and revising or closing the existing programmes.**

## Analysis

The information on the study programs offered by the HEI is publicly available in Croatian and English. HEI makes use of the feedback from professional organisations including **Croatian Geodetic Society, Croatian Cartographic Society, Croatian Chamber of Chartered Engineers of Geodesy, Croatian Employers' Association** – The Association of Employers in Geodetic and Geoinformatics profession and students' polls (to a certain extent) to update the courses content/syllabi. Bachelor and Master study programs were updated in 2015 and the postgraduate doctoral study in 2016.

## Recommendations for improvement

- The HEI should put more efforts in increasing the participation of the students in filling out the evaluation forms designed to collect information on the delivered education.
- The information offered in English about the study programs should be improved regarding completeness.

## Quality grade

High level of quality

**2.5. The higher education institution ensures that ECTS allocation is adequate.**

## Analysis

The HEI made some efforts towards improving the ECTS allocation during the last years. However, according to the students' polls conducted between February and March 2018 for the Master Study Program, the ECTS are not appropriately allocated to the vast majority of the offered courses, including both mandatory and elective courses. In an attempt to improve the ECTS allocation, it was decided to divide the courses with a more significant workload into two courses without providing any explanation or evidence on how the ECTS were allocated among the two courses.

## Recommendations for improvement

- The HEI needs to organize or to offer teachers the possibility to attend pedagogical training courses to help them better allocate ECTS credit based on student workload and, therefore, to better design and re-design the learning materials.

### Quality grade

Minimum level of quality

## **2.6. Student practice is an integral part of study programmes (where applicable).**

### Analysis

The HEI included compulsory professional practice in the curriculum. However, the practice period is too short (two weeks) to permit students adequate development of practical skills which might increase their competitiveness on the labour market.

Undergraduate students have more practical activities in the third study year, but these activities seem not to be sufficient during the first two years.

### Recommendations for improvement

The HEI is recommended to extend the period for professional practice by taking advantage of its strong connections and network with the industry, professional associations, and State agencies. Undergraduate students need to be actively included in practical projects carried out at the Faculty. The Faculty should also integrate research components in some of the courses offered in the Bachelor's Degree program.

### Quality grade

Minimum level of quality

## **2.7. Lifelong learning programmes delivered by the higher education institution are aligned with the strategic goals and the mission of the higher education institution, and social needs.**

### Analysis

The HEI is active in offering **Lifelong Learning Programs** either through a postgraduate specialist study programme or a pool of courses available for the Croatian Chamber of Chartered Engineers of Geodesy. However, there is no evidence on how the quality of offered courses is evaluated. Furthermore, there is no information on the learning outcomes, skills, and competences acquired by the participants. The learning methods are not clearly described and there is no information on the software used to

teach the intended methods and technology. The postgraduate specialist study programme has a very low number of participants.

#### Recommendations for improvement

- HEI should provide on their website a clear description of the intended learning outcomes, the content of the offered course, competences and skills acquired by the course participants. Furthermore, the Alumni network could be better involved to update the list and content of the offered lifelong learning courses.
- Given the small number of students enrolled in the postgraduate specialist study programme, the HEI should evaluate the strengths and weaknesses of this program and decide its continuation or cessation.

#### Quality Grade

Satisfactory level of quality

### *III. Teaching process and student support*

**3.1. Admission criteria or criteria for the continuation of studies are in line with the requirements of the study programme, clearly defined, published and consistently applied.**

#### Analysis

The HEI clearly defines and publishes online the academic criteria for admission and continuation of studies. The criteria for admission to master-level studies from candidates who have adequately completed the bachelor-level study programme are also provided transparently. Student achievements in national competitions in mathematics, physics, geodesy, computer science and astronomy are rewarded with direct admission to the programme of bachelor-level studies. Recognition of successful exams when transferring from one HEI to another is given by the ECTS coordinator.

#### Recommendations for improvement

- The Faculty of Geodesy is not recognized as a compelling institution for students from other HEIs. Some improvements are necessary in order to draw attention from students on national and global level.

#### Quality grade

High level of quality

### **3.2. The higher education institution gathers and analyses information on student progress and uses it to ensure the continuity and completion of study.**

#### **Analysis**

Data about students' academic success and progress throughout their studies based on ISVU system is regularly collected and analysed by the vice dean for academic and students affairs. Analysis reports are regularly given to the teaching board and to the members of the Faculty Council. In order to increase exam pass rates, some classes were changed from obligatory to optional. The practice of having double (back-to-back) examination periods within a four-week interval force students to have 2-3 exams in a very short period of time which may cause low pass rates, especially in the first and second year of study.

#### **Recommendations for improvement**

- The examination period should be extended to four weeks and the number of exams (per course) that the students can take in one academic year should be decreased from 4 to 2. The course exams must be spread logically during the examination period. These actions could raise the academic responsibility in the student body and improve their attitude towards their studies.

#### **Quality grade**

Satisfactory level of quality

### **3.3. The higher education institution ensures student-centred learning.**

#### **Analysis**

HEI's academic programme is delivered variously through different types of teaching activities. The Faculty allows students to become familiar with various surveying instruments and related methodologies. Students can attend some optional course units in other academic study programmes so that they can expand their knowledge in new directions. Furthermore, HEI encourages and rewards student excellence with several types of academic awards, e.g. Dean's award, Rector's award, etc. The number of research seminars delivered by PhD students, and especially master's students, is on a poor level. Students are not generally satisfied with the amount of practical work during their studies.

#### **Recommendations for improvement**

- Professional practice gained by students outside the Faculty of Geodesy should be expanded from the current two-week period, so that the students could get a

better feeling of what is going on in the labour market. Also, it would be nice to refresh practice from 2009 when the faculty, in cooperation with private companies, arranged two-week professional practice in Novska.

#### Quality grade

Minimum level of quality

### **3.4. The higher education institution ensures adequate student support.**

#### Analysis

The HEI operates an administration office for student affairs which provides information and support to students for all academic matters related to their studies. Guided counselling on studying and career opportunities are provided by the Study Advisors and the vice Dean for academic and student affairs. In general, the students are well informed about their rights and the available student-related support. Also consultation hours are defined clearly and published online. The availability of the HEI' teaching staff for student consultation seems to be at a very satisfactory level.

#### Recommendations for improvement

There are certain issues concerning the operation of the HEI's library that can (and should) be improved – specific recommendations on this aspect are provided in section 4.6.

#### Quality grade

High level of quality

### **3.5. The higher education institution ensures support to students from vulnerable and under-represented groups.**

#### Analysis

The HEI doesn't currently have any students with disabilities. There also no students who are declared as persons from vulnerable or disadvantaged groups. Yet, all the premises of Faculty of Geodesy have been designed to accommodate any future needs for students with mobility disadvantages. Occasional operational issues related to vulnerable students are always resolved in favour of students, in the sense that the teaching and the course assessment process can be adjusted to the individual needs of students from vulnerable groups. There is an advisor for disadvantaged students operating at the faculty level. Also, since 2011-2012 there exists a new course unit

entitled “Peer support for students with disabilities”, which is offered at the University level in Zagreb.

#### Recommendations for improvement

- The HEI seems to be well prepared in support of vulnerable students - no particular recommendations are given at this point.

#### Quality grade

High level of quality

### **3.6. The higher education institution allows students to gain international experience.**

#### Analysis

Students are well informed about mobility options in the frame of Erasmus+ and Ceepus international study programmes, which are coordinated by the HEI's ECTS coordinator. Student interest for international mobility seems to grow higher every year, which is clear evidence that the HEI promotes these programmes in an effective way. Students had also the opportunity to gain international experience by participating in the international congress LADM2018 (Land administration domain model 2018). Teachers are not obligated to deliver course material and classes in English - only six courses are optionally provided in the English language.

#### Recommendations for improvement

- Flexibility in delivering courses either in the Croatian or English language should be increased. The HEI should encourage and support the increase in the international mobility of its students.

#### Quality grade

High level of quality

### **3.7. The higher education institution ensures adequate study conditions for foreign students.**

#### Analysis

The incoming mobility of students to the Faculty of Geodesy is much smaller compared to the outgoing student mobility. The main reason is that the usage of English language is not stimulated and encouraged. It is indicative that the number of English geodetic



textbooks and scientific journals in the library is exceptionally small. Foreign students can take Croatian language courses only at the University level.

#### Recommendations for improvement

- Some actions need to be taken in order to increase the incoming student mobility, especially the number of classes that can be delivered in English. The library needs also to be significantly enriched in terms of English textbooks and journals (see also section 4.6).

#### Quality grade

Minimum level of quality

### **3.8. The higher education institution ensures an objective and consistent evaluation and assessment of student achievements.**

#### Analysis

In almost all of the courses in the academic programmes delivered by HEI the criteria used in their grading methods are clear and well-known to the students beforehand (prior to the exams). The students' comments during the site visit regarding the course grading methods, as well as the received feedback from the course evaluation results, assured that the grading schemes in place are adequate. The grading criteria and the student knowledge assessment are aligned with the teaching methods that are used in class. Special needs of students are taken into account if needed. Pedagogical education of the teaching staff members was not ascertained. Evaluation of grading is not absent but could be more systematic.

#### Recommendations for improvement

- Implication of teaching and learning scholarships could improve the development of the faculty. Also the pedagogical education of the teaching staff members should be promoted and supported. Finally, the evaluation of course grading is not absent but it could be more systematic.

#### Quality grade

Satisfactory level of quality

### **3.9. The higher education institution guarantees the issuance of Diploma Supplements and adequate qualification information.**

#### **Analysis**

The long tradition of the Faculty of Geodesy in the University of Zagreb is supported by the issuance of very clear Diplomas and Diploma supplements, which are fully compliant with all relevant academic regulations.

#### **Recommendations for improvement**

The practices that are currently in use are fine and should be kept.

#### **Quality grade**

High level of quality

### **3.10. The higher education institution is responsible for the employability of graduates.**

#### **Analysis**

There is clear evidence that the HEI analyses the employability of its past students, although some discrepancies in the timing and time-tagging of those analyses provide somewhat contradictory data. According to statements from all groups of people that participated in the site visit, the unemployment rate among geodetic engineers in Croatia is negligible. The statistics that were provided show an obvious difference from this situation.

To support the monitoring of the employability of its graduates, the HEI has established strong connection with the Croatian Society of Geodesy which is mostly constituted of previous students from the Faculty of Geodesy of the University of Zagreb (80+%). An Alumni Association was also established a few years ago (with the support of the HEI), but its potential towards employability monitoring is so far not used fully.

#### **Recommendations for improvement**

- Wider and more systematic use of the alumni association could further improve the situation.
- Career days and job fairs could be possible undertakings to foster the relations between the faculty and its graduates.
- Employability data from the Croatian geodetic community (consisting mostly of graduates from the HEI) could be used more.

### Quality grade

Satisfactory level of quality

## *IV. Teaching and institutional capacities*

### **4.1. The higher education institution ensures adequate teaching capacities.**

#### Analysis

HEI has unbalanced distribution of the teaching load. Temporary teaching staff makes 50% of the teaching capacity. HEI employs very many teaching assistants (TAs) who are PhD students. Their teaching load is far too high, and leaves insufficient time for the PhD research.

TAs have no pedagogical preparation, and do not have any teaching expertise.

#### Recommendations for improvement

- To reduce teaching load of PhD students to free their time for PhD-related research;
- To request the certified attendance of specialized pedagogical courses by all PhD students, postdocs and junior teaching staff; to request certificates of pedagogical training from all newly-employed teaching staff.

### Quality grade

Satisfactory level of quality

### **4.2. The higher education institution has an objective, transparent and excellence-based procedure of teacher recruitment.**

#### Analysis

HEI follows the national regulations in academic staff recruitment, the procedure seems to be objective.

HEI has no high-profile international academic employees. Job announcements are published nationally but have limited international exposure. This hampers appointment of international academic and teaching staff.

#### Recommendations for improvement

- To advertise new jobs to a broad international community;

- To place strong focus on academic excellence in new appointments;
- To increase the number of international high-profile staff at all levels.

### Quality grade

#### Minimum level of quality

### **4.3. Teacher advancement and re-appointment is based on objective and transparent procedures.**

#### Analysis

Re-appointment procedure follows state regulations. However, presently HEI has disproportion in the ratio of senior to junior academic staff.

According to feedback at different levels, self-evaluation report and HEI web-site, HEI has little room for promotion of teaching staff. According to feedback, teaching excellence is not rewarded.

#### Recommendations for improvement

HEI is encouraged:

- To increase the number of tenured junior academic staff.
- To develop and implement strategy for rewarding teaching and research excellence.

### Quality grade

#### Minimum level of quality

### **4.4. The higher education institution provides support to teachers in their professional development.**

#### Analysis

According to self-evaluation report, HEI supports teachers “by informing them about the possibilities, providing for them the participation in individual activities and by providing financial support”. However, HEI does not have strategy for professional development of teachers. A large number of teaching staff (TA) have no pedagogical preparation, neither teaching expertise. Teaching personal is knowledgeable and dedicated at all levels. However, according to feedback at all levels, HEI has neither strategy nor practise for recognition and motivation of excellence in teaching. Not all teachers have the same level of support of their courses, and some courses have insufficient number, or lack, of teaching assistants, which results in disproportional teaching load.

HEI participates in ERASMUS+/BESTSDI international projects with a ca. 40K euro annual funding for 3 years. HEI encourages participation of teaching and research staff in national and international conferences. In 2017, HEI paid 35 fees for teachers for their participation at scientific conferences. However, outside conference activities, international mobility of teaching staff is not at the level of international high-profile institutions and is largely limited to short-term research visits in both directions. Scientific productivity of permanent teaching staff over the past 5 years remains low by international standards, with a low number of publications in high-ISI international peer-review journals. Similarly, the publication level of temporary teaching staff is very low.

### Recommendations for improvement

- To request the certified attendance of specialized pedagogical courses by all PhD students, postdocs and junior teaching staff; to request certificates of pedagogical training from all newly-employed teaching staff;
- To develop strategy for motivation and promotion of both teaching and academic excellence and to implement it in practice;
- To increase international mobility of teaching and research staff, in particular for long-term stays;
- To involve international high-profile experts in teaching through a series of regular invited lectures and short courses at undergraduate, postgraduate and professional levels;
- To involve international high-profile experts in co-supervision of PhD projects;
- To increase scientific visibility of HEI through an increased number of publications by research and teaching, permanent and temporary staff in high-ISI international peer-review journals;
- To ensure adequate support by teaching assistants to all courses;
- To establish regular, at least monthly, seminars with participation of junior academic staff and graduate students.

### Quality grade

Minimum level of quality

**4.5. The space, equipment and the entire infrastructure (laboratories, IT services, work facilities etc.) are appropriate for the delivery of study programmes, ensuring the achievement of the intended learning outcomes and the implementation of scientific/artistic activity.**

#### Analysis

HEI has a well-developed infrastructure for providing professional teaching and work environment. Laboratories are spacious and the computer facilities are mostly up-to-date, some are well equipped.

Students have access to computer facilities also during the off-office hours. HEI provides an adequate level of IT support and web-based services related to the work environment and the teaching needs. Teaching is based on open-source software. Instrumental (geodetic) facilities are mostly old, mostly in a good condition, with a limited amount of recent acquisitions, partially due to financial limitations, although some funding applications to EU to renew the instrument pool are on the way.

#### Recommendations for improvement

- To develop strategic plan for renovation and acquisition of the geodetic instrument pool and to increase efforts for getting external funding;
- To renew the geodetic instrument pool, used both for teaching and research. Having in mind limited funds, HEI is encouraged to develop a closer cooperation with ALUMNI "AMCA-Geof" which is open to help with the procurement and/or the donation of surveying and geodetic instruments.

#### Quality grade

Satisfactory level of quality

**4.6. The library and library equipment, including the access to additional resources, ensure the availability of literature and other resources necessary for a high-quality study, research and teaching.**

#### Analysis

HEI shares library with two other HEI of the University of Zagreb that are located in the same building. The library is hosted in a spacious user-friendly hall, students have access to the library over a broad time framework, and have assistance of a professional librarian. However, the number of book shelves is far too small to accommodate the amount of professional literature expected for a high profile HEI.

Self-evaluation report states that the library has ca. 30,000 professional book titles and ca. 300 journals and that "the books are purchased from time to time based on the

information about the necessary titles obtained from teachers". The reference collection includes encyclopaedias, lexicons, manuals, and all past MS and PhD theses.

The site visit has shown that the English textbook collection in geodesy and geoinformatics is relatively poor, with only a few recent titles being available. The number of titles in electronic versions of books in geodesy and geoinformatics from leading international publishers is limited. Systematic collection of professional and teaching books does not exist. The number of paper copies of textbooks is limited to very few (ca. 5 copies), which would be totally inadequate in the absence of e-resources. HEI has access to electronic professional library resources through the Ministry services, which includes access to WoS, Science Direct, etc., and through the University which provides access to full texts of selected professional journals. However, printed versions of professional journals in geodesy, geoinformatics and related disciplines are nearly absent in the library.

### Recommendations for improvement

- To develop strategic plan for new systematic and regular library acquisitions;
- To increase significantly the diversity of titles of professional literature in the library, in particular old and new "classical" books and textbooks by leading international experts in geodesy, geoinformatics and related disciplines; this should be done through a systematic campaign during which the list of most important titles (ca. 50-100) should be identified and acquired. This can be achieved through a closer cooperation with ALUMNI "AMCA-Geof" which is open to help with new acquisitions and donations to the HEI library;
- To increase significantly the amount of professional literature in English, both books and textbooks;
- To ensure subscriptions to leading high-ISI international professional journals;
- To foster development of the electronic library of major international professional books.

### Quality grade

Minimum level of quality

## **4.7. The higher education institution rationally manages its financial resources.**

### Analysis

HEI is transparent in providing major information on its income and expenditures.

About 80-85% of funding comes from the state agencies, ca. 10-15% from research grants and from private sector (this share is decreasing due to a general unfavourable financial situation), and ca. 5% comes from scholarships.

Expenditure structure is ca. 85% to salary payments, ca. to 15% maintenance costs, and a small fraction goes to equipment costs and small financial bonuses to staff and students (e.g. conference registration fees).

HEI has an unbalanced budget for both income and expenditures. Income is heavily dominated by the guaranteed Ministry contribution. Very limited effort is made to raise independent funding from competitive sources. This results in the overall tight budget where almost no financial resources are left beyond the wage payments for infrastructure development and professional promotion of the staff and students. Many more things that can be done, compared to what is already done.

### Recommendations for improvement

On the income side:

- To increase success rate in applications to national and international science agencies by bringing the scientific level of the academic personal to the international competence level;
- To develop strategy for application for external academic research funding nationally and internationally, including large-scale EU funding schemes;
- To extend and expand international professional network to boost HEI involvement into international small-scale and EU-scale academic and business funding options;
- To boost national activity in private and in state sector, involving ALUMNI where possible, to increase funding from these sectors;
- To develop budget strategy for external funding, in particular regarding the maximum allowed budget for the applicant's personal salary, HEI overheads, budget for instrument pool, etc.

On the expenditure side:

- To increase the number of scholarships to attract a high-profile academic personal at all levels, starting from PhD;
- To recognize, encourage, and award high professional performance and academic excellence at all levels, starting from a student level; to develop strategy of financial awards and promotion at all levels;
- To increase funding to the instrument pool and to develop strategy for its renewal;
- To make strategy for the campaign and regular library acquisitions and to include them into the budget.



## Quality grade

### Minimum level of quality

## V. *Scientific/artistic activity*

### **5.1. Teachers and associates employed at the higher education institution are committed to the achievement of high quality and quantity of scientific research.**

#### Analysis

There is obvious evidence of internationally published research, some of it considerably high quality. Still, it could be somewhat higher in quantity and significantly higher in selection of journals where to publish – the list of the journals in the self-analysis report is quite dominated by the Croatian journals with not so high international impact. Part of the faculty, the Hvar observatory, is along its long tradition remarkably effective in publishing their research findings.

The discussions during the site visit still brought out the problem that it is possible to advance in career without significant research achievements. It is left on the researcher. Which is good (research is something related to personal curiosity) and problematic (if your position assumes research and there are no sufficient mechanisms to influence motivation to do so) at the same time.

#### Recommendations for improvement

- More flexible rewarding for excellence (initiatives are there at the faculty, they should be reasonably developed and enforced).

## Quality grade

### Minimum level of quality

### **5.2. The higher education institution provides evidence for the social relevance of its scientific / artistic / professional research and transfer of knowledge.**

#### Analysis

Professional research of the faculty is well accepted in the society/state. The status of geodesy is high. There is clear evidence of usage of professional knowledge of the faculty in solving practical / applied needs of the society. There is clear evidence of transfer of knowledge, like lifelong learning programmes and participation (also in cooperation with the society of geodesy and chamber of geodesy) in professional

upgrade training. The income from the enterprises for applied research is quite limited. The faculty considers the needs of the society in planning its research.

#### Recommendations for improvement

Development of the connections with the society of geodesy and the society of cartography would improve the social role of the faculty.

#### Quality grade

Satisfactory level of quality

### **5.3. Scientific/artistic and professional achievements of the higher education institution are recognized in the regional, national and international context.**

#### Analysis

There is very clear evidence of high recognition of achievements on regional /national level. International recognition (as based on international high impact research publications) could be better although there are appreciable undertakings towards that. Evidence of participation in European research projects was provided.

#### Recommendations for improvement

More attention to international recognition, wider publication in high impact journals would be good for the faculty development. Wider participation in international projects (applications) would not hurt.

#### Quality grade

Satisfactory level of quality

### **5.4. The scientific / artistic activity of the higher education institution is both sustainable and developmental.**

#### Analysis

There is evidence of following the tradition which grants certain academic sustainability (i.e. keeping the level), in particular with regards to the teaching and training of geodetic engineers and the implementation of applied geodetic research at national level. Recognition and awarding of this evidence also exists. However, it should be noted that due to: (a) the extremely high rate of internal advancement in the renewal model of the faculty staff and (b) the shortage of the impact of internationally

acknowledged HEI-based research, the Faculty of Geodesy should be considered as relatively vulnerable and not very much development-oriented.

#### Recommendations for improvement

More international exchange/experience in the faculty staff would definitely improve the HEI's academic strength.

#### Quality grade

Minimum level of quality

### **5.5. Scientific/artistic and professional activities and achievements of the higher education institution improve the teaching process.**

#### Analysis

There is obvious evidence of research results being involved in improvement of teaching. New knowledge is included in teaching materials, sharing the latest finding with the students still depends mostly on the teacher. There is renewal program for the equipment.

#### Recommendations for improvement

- The faculty is developing in the right direction.
- More international research project involvement would not hurt.
- Study at the PhD level could be less dependent on the teaching obligation.

#### Quality grade

Satisfactory level of quality

## APPENDICES

### 1. Quality assessment summary - tables

<i>Quality grade by assessment area</i>				
<i>Assessment area</i>	Unsatisfactory level of quality	Minimum level of quality	Satisfactory level of quality	High level of quality
<i>I. Internal quality assurance and the social role of the higher education institution</i>			X	
<i>II. Study programmes</i>			X	
<i>III. Teaching process and student support</i>			X	
<i>IV. Teaching and institutional capacities</i>		X		
<i>V. Scientific/artistic activity</i>		X		

<i>Quality grade by standard</i>				
<i>I. Internal quality assurance and the social role of the higher education institution</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
1.1. The higher education institution has established a functional internal quality assurance system.			X	
1.2. The higher education institution implements recommendations for quality improvement from previous evaluations.		X		
1.3. The higher education institution supports academic integrity and freedom, prevents all types of unethical behaviour, intolerance and discrimination.			X	
1.4. The higher education institution ensures the availability of information on important aspects of its activities (teaching, scientific/artistic and social).			X	
1.5. The higher education institution understands and encourages the development of its social role.				X

<i>Quality grade by standard</i>				
<i>II. Study programmes</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
2.1. The general objectives of all study programmes are in line with the mission and strategic goals of the higher education institution and the needs of the society.			X	
2.2. The intended learning outcomes at the level of study programmes delivered by the higher education institution are aligned with the level and profile of qualifications gained.			X	
2.3. The higher education institution provides evidence of the achievement of intended learning outcomes of the study programmes it delivers.			X	
2.4. The HEI uses feedback from students, employers, professional organisations and alumni in the procedures of planning, proposing and approving new programmes, and revising or closing the existing programmes.				X
2.5. The higher education institution ensures that ECTS allocation is adequate.		X		
2.6. Student practice is an integral part of study programmes (where applicable).		X		
2.7. Lifelong learning programmes delivered by the higher education institution are aligned with the strategic goals and the mission of the higher education institution, and social needs.			X	

### *Quality grade by standard*

<i>III. Teaching process and student support</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
3.1. Admission criteria or criteria for the continuation of studies are in line with the requirements of the study programme, clearly defined, published and consistently applied.				X
3.2. The higher education institution gathers and analyses information on student progress and uses it to ensure the continuity and completion of study.			X	
3.3. The higher education institution ensures student-centred learning.		X		
3.4. The higher education institution ensures adequate student support.				X
3.5. The higher education institution ensures support to students from vulnerable and under-represented groups.				X
3.6. The higher education institution allows students to gain international experience.				X
3.7. The higher education institution ensures adequate study conditions for foreign students.		X		
3.8. The higher education institution ensures an objective and consistent evaluation and assessment of student achievements.			X	
3.9. The higher education institution guarantees the issuance of Diploma Supplements and adequate qualification information.				X
3.10. The higher education institution is responsible for the employability of graduates.			X	

### *Quality grade by standard*

<i>IV. Teaching and institutional capacities</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
4.1. The higher education institution ensures adequate teaching capacities.			X	
4.2. The higher education institution has an objective, transparent and excellence-based procedure of teacher recruitment.		X		
4.3. Teacher advancement and re-appointment is based on objective and transparent procedures.		X		
4.4. The higher education institution provides support to teachers in their professional development.		X		
4.5. The space, equipment and the entire infrastructure (laboratories, IT services, work facilities etc.) are appropriate for the delivery of study programmes, ensuring the achievement of the intended learning outcomes and the implementation of scientific/artistic activity.			X	
4.6. The library and library equipment, including the access to additional resources, ensure the availability of literature and other resources necessary for a high-quality study, research and teaching.		X		
4.7. The higher education institution rationally manages its financial resources.		X		



### *Quality grade by standard*

<i>V. Scientific/artistic activity</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
5.1. Teachers and associates employed at the higher education institution are committed to the achievement of high quality and quantity of scientific research.		X		
5.2. The higher education institution provides evidence for the social relevance of its scientific / artistic / professional research and transfer of knowledge.			X	
5.3. Scientific/artistic and professional achievements of the higher education institution are recognized in the regional, national and international context.			X	
5.4. The scientific / artistic activity of the higher education institution is both sustainable and developmental.		X		
5.5. Scientific/artistic and professional activities and achievements of the higher education institution improve the teaching process.			X	

## 2. Visit protocol

**Monday, 14th 2018**

### **Hotel International**

**10:00 – 13:00** *Training for the expert panel members – short presentation of ASHE, introduction to the higher education system in Croatia, introduction to the re-accreditation procedure, standards for the evaluation of quality and writing the final report*

**13:00 – 14:00** *Lunch*

**14:00 – 20:00** *Preparation of the expert panel members for the site visit (working on the Self-evaluation report)*

**Tuesday, 15<sup>th</sup> May 2018**

### **Faculty of Geodesy University of Zagreb**

**9:00 – 10:00** Meeting with the dean, vice deans and secretary (*no presentations*)

**10:00 – 10:45** Meeting with the working group that compiled the Self-Evaluation

**10:45 – 11:30** *Internal meeting of the panel members (Document analysis)*

**11:30 – 12:30** Meeting with the students (open meeting)

**12:30 – 14:00** *Working lunch*

**14:00 – 14:45** Meeting with the heads of study programmes

**14:45 – 15:30** Meeting with the *Alumni*

**15:30 – 16:30** Meeting with external stakeholders -representatives of professional organisations, business sector/industry sector, professional experts, non-governmental organisations, external lecturers

**16:30 - 17:30** Organisation of additional meeting on potential open questions (if it is needed)

**17:30 – 20:00** *Internal meeting of the panel members (Discussion)*

### **Wednesday, 16<sup>th</sup> May 2018**

- 9:00 – 9:45** Meeting with the vice dean for teaching
- 09:45 – 10:45** Meeting with full-time employed teachers (open meeting)
- 10:45 – 11:30** *Internal meeting of the panel members (Document analysis)*
- 11:30 – 12:30** Meeting with teaching assistants
- 12:30 – 14:00** *Working lunch*
- 14:00 – 14:45** Meeting with the vice dean for research
- 14:45 – 15:30** Meeting with the heads of research projects
- (15:30 – 16:30** Organisation of additional meeting on potential open questions if it is needed)
- 16:30 – 20:00 (Hotel International)** *Internal meeting of the panel members (Discussion)*

### **Thursday, 17<sup>th</sup> May 2018**

- 09:00–10:00** Tour of the Faculty (library, student services, international office, IT services, classrooms) and participation in teaching classes
- 10:00–11:30** *Internal meeting of the panel members*
- 11:30 – 11:45** Exit meeting with the dean, vice deans and secretary
- 11:45 – 13:00** Work Lunch
- 13:00 – 20:00 - (Hotel International)** Internal meeting of the panel members (Discussion) and drafting the final report

### **Friday, 18<sup>th</sup> May 2018**

- 09:00 – 13:00** Drafting the final report

## SUMMARY

The Faculty of Geodesy in the University of Zagreb has a long and strong tradition whose origins go way back in time, well before its autonomous conception in 1962. This is a big advantage which has allowed the HEI to deliver well-recognized study programmes (despite the hassles caused by the Bologna declaration, to provide solid training for the Croatian geodetic and surveying profession, and to produce engineers, cartographers and geomatics scientists that can potentially compete at international level with other European graduates of similar academic profile. The aforementioned advantage has also forced the HEI to respond, in a successful way, to the national needs of maintaining and modernizing the Croatia's geospatial infrastructure, and to regularly provide expert service through several professional/commercial projects which seem to be well-integrated into HEI' research activities with profound benefits for the Faculty of Geodesy. However, this long and strong tradition is also a dangerous trap which could be gradually transformed to a serious disadvantage that affects the HEI's healthy development and future evolution. To a certain extent this is already happening in the Faculty of Geodesy where the dominating attitude revolves around a sluggish operational model that supposedly leaves minimal degrees of freedom to do things in a different, and possibly better, way. This has caused HEI to become a rather "closed" academic system in the sense that its academic personnel (especially the young generation which has to take over sooner or later) not only originates solely from the same University/Faculty, but it eventually follows a typical and fully predictable path that does not promote or reward personal career initiatives. This situation creates threats and limits the HEI's ability to become more competitive, to widen and strengthen its international ties, and to build up strong academic international networks that will increase the incoming research projects, which is currently one of the key points that needs to be improved. Overall, the Faculty of Geodesy is the leading geodetic institution in Croatia with a prominent academic status and well-justified role in the training of surveying/geomatics engineers and geodetic specialists in support of current and future demands of the national and international job market. Yet, a more focused strategic vision along with a solid and well-monitored implementation plan is required to address the necessary changes and to apply the specific recommendations that have been provided in the previous detailed analysis given in this report.