



agency for science and higher education

**REPORT  
OF THE EXPERT PANEL  
ON THE RE-ACCREDITATION OF  
FACULTY OF MINING, GEOLOGY AND PETROLEUM  
ENGINEERING  
UNIVERSITY OF ZAGREB**

**Date of site visit: 20<sup>th</sup> – 22<sup>nd</sup> November 2018**

February 2019

**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 the Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb.

### Members of the Expert Panel:

- Prof. Irina Artemieva, Ph.D., Department of Geosciences and Natural Resources Management (IGN), University of Copenhagen, Kingdom of Denmark,
- Asst. Prof. Beatrice Castellani, Ph.D., CIRIAF, University of Perugia, Republic of Italy,
- Prof. Hans Thybo, Ph.D., Eurasia Institute of Earth Sciences, Istanbul Technical University, Republic of Turkey,
- Prof. Damir Šljivac, Ph.D., Department of Power Engineering, Faculty of Electrical Engineering, Computing and Information Technology, Josip Juraj Strossmayer University of Osijek, Republic of Croatia,
- Dorotea Starčević, student, Faculty of Civil Engineering, University of Rijeka, Republic of Croatia.

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

- Dean, vice deans and secretary,
- Self-evaluation Report Committee, the Faculty Quality Management Committee and the Quality and Information Management Office,
- Full-time teaching staff,
- Students,
- Alumni,
- Teaching assistants,

- Heads of research projects,
- External stakeholders - 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.

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 the Faculty of Mining, Geology and Petroleum Engineering on the basis of the Faculty 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,
- 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 Mining, Geology and Petroleum Engineering and writing of the Report, the Expert Panel was supported by:

- Mia Đikić, coordinator, ASHE,
- Sanja Smiljanić, coordinator, ASHE,
- Goran Briški, interpreter at the site visit, ASHE.

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.

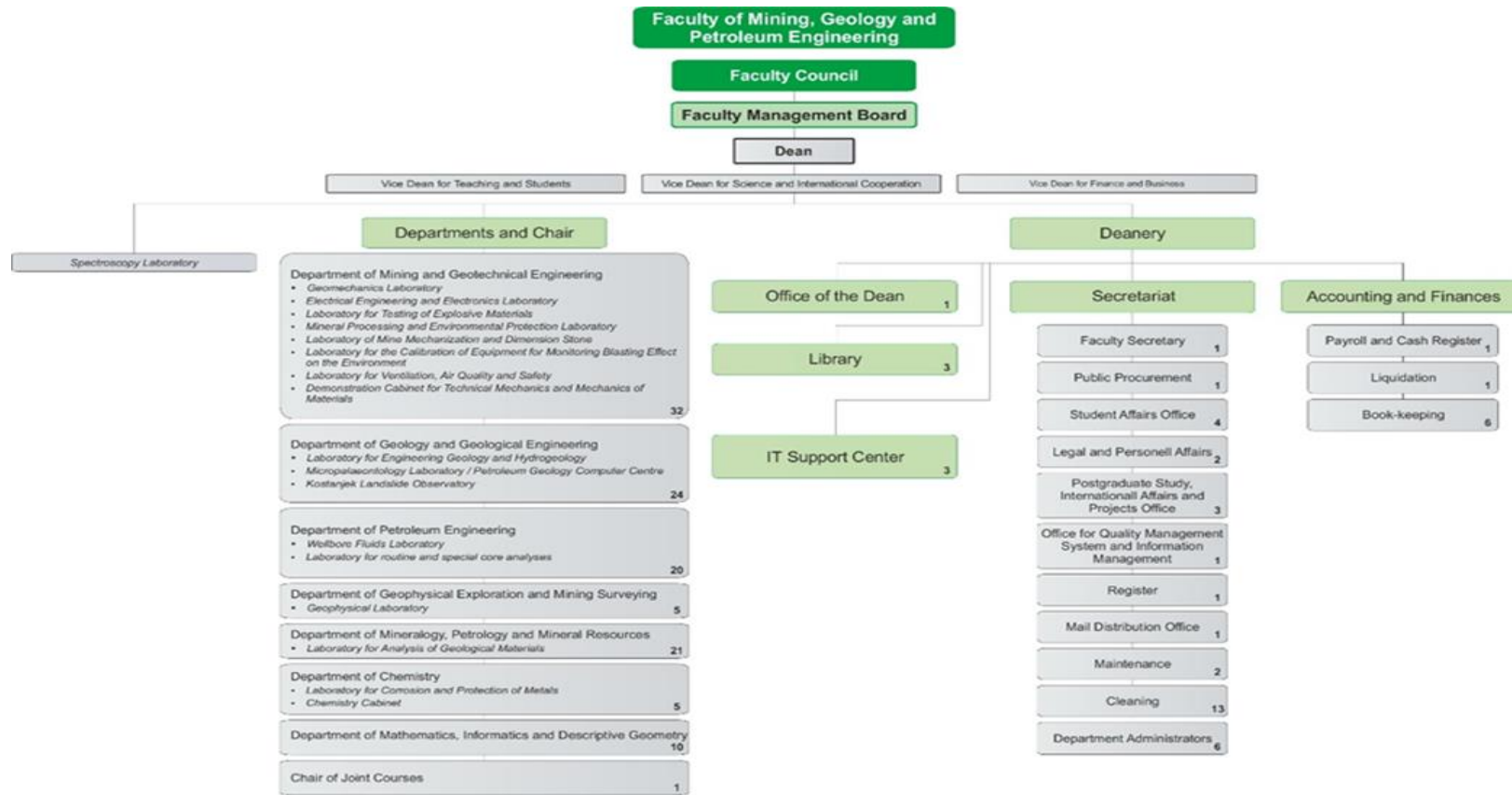
## **SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION**

**NAME OF HIGHER EDUCATION INSTITUTION:** Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb

**ADDRESS:** Pierottijeva 6, 10 000 Zagreb

**DEAN:** prof. Zoran Nakić, PhD, Full Professor

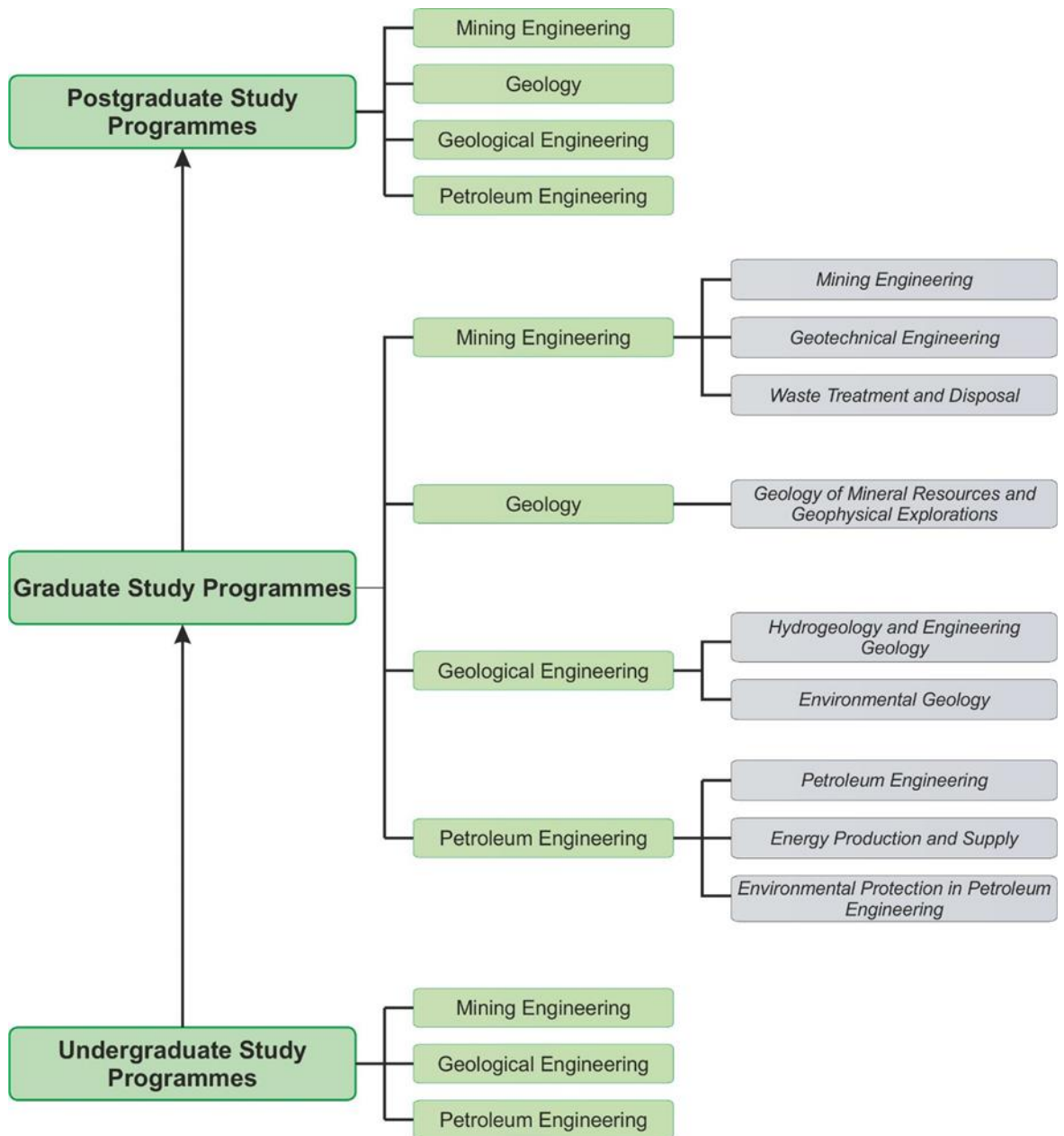
## ORGANISATIONAL STRUCTURE



Total number of Employees: 168

From the Self-evaluation Report, Faculty of Mining, Geology and Petroleum Engineering, p. 4.

## STUDY PROGRAMMES



*From the Self-evaluation Report, Faculty of Mining, Geology and Petroleum Engineering, p. 7*

**NUMBER OF STUDENTS: 856**

**NUMBER OF TEACHERS: 63**



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

The Faculty of Mining, Geology and Petroleum Engineering (RGNF) is a constituent part of the University of Zagreb, which organizes and conducts university studies and develops scientific and professional work in two scientific areas: the area of technical sciences and the area of natural sciences. It is the only faculty in the Republic of Croatia that operates in the field of mining engineering, petroleum engineering and geological engineering pertaining to technical sciences and one of two faculties operating in the field of geology pertaining to natural sciences. The Faculty is conducting undergraduate studies of Mining Engineering, Geological Engineering and Petroleum Engineering and graduate studies of Mining Engineering, Geological Engineering, Geology and Petroleum Engineering. Faculty teachers participate in conducting several university studies (undergraduate university study programme of Engineering in English, undergraduate university military study programme of Military Engineering, university specialist study programmes of Crisis Management and Ecoengineering, joint doctoral study programme Geoengineering and Water Management, established on the basis of the interuniversity consortium agreement signed by the rectors of Graz University of Technology, Budapest University of Technology and Economics, University of Maribor and University of Zagreb) and numerous international projects (bilateral projects, H2020 projects, COST and EIT RawMaterials projects, lifelong learning projects, etc.). The Faculty is actively involved in the work of several consortia (EIT Raw Materials, International Consortium on Landslides (ICL), CO2 GeoNet, ENeRG and ESEIA).

The Faculty is a constituent of the University of Zagreb, and with its representatives in the Technical Area Council, the Natural Science Area Council, the Senate of the University of Zagreb, the Budget Committee and the Science and International Cooperation Committee of the University of Zagreb, actively contributes to the overall activity of the University. The Faculty staff is involved in the work of the Scientific Field Committees (Field Committee on Chemical Engineering, Mining, Petroleum and Geological Engineering, Metallurgy, Textile Technology and Graphics Technology and the Field Committee on Geology) and the Sectoral Council III. for Mining Engineering, Geology and Chemical Technology at the Ministry of Science and Education of the Republic of Croatia, in the work of the Croatian Academy of Sciences and Arts (HAZU) and the Croatian Academy of Engineering (HATZ), and they also hold leading positions in local and international professional associations. The Faculty is an institution that offers solutions for a variety of contemporary problems and challenges that are imposed on the world and Croatia, such as the growing need for natural resources, energy crisis resolution, use of alternative energy sources, karst exploration, research of climate change impacts and opportunities for their mitigation, protection of soil and drinking water as well as all other environmental elements, predicting risks from natural disasters and human activities, eliminating their consequence and the like. It is the only higher education institution in Croatia studying methods of rock blasting and special rock blasting and their adverse impacts. Operating at the Faculty are: Explosives Testing Laboratory, accredited in accordance with the requirements of HRN EN ISO/IEC 17025:2007, and the Calibration Laboratory, authorized by the company INSTANTEL, which has taken up a prominent place at European level.

*From Self-evaluation document, Faculty of Mining, Geology and Petroleum Engineering, p. 1*

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

## **ADVANTAGES OF THE INSTITUTION**

1. RGNF covers a broad range of academic and engineering disciplines with a broad spectrum of topics. This opens multiple possibilities to adjust the activities to the changing market. For example, in recent years RGNF became involved in geothermal energy, environmental protection, waste management, and CO<sub>2</sub> sequestration projects.
2. RGNF provides good training to young specialists as stated by potential employers from public and private sectors, who expressed satisfaction with the level of knowledge by the Faculty graduates.
3. RGNF has experienced teachers and dedicated TAs.
4. RGNF has an excellent mineral/rock collection, which is professionally displayed, yet in a teaching room. The panel suggests that RGNF considers a possibility of public display of the collection, possibly by opening a museum. This would attract public interest to the Faculty, increase its visibility, and may become an additional income source.
5. Everyone at RGNF, whom the Panel met, has a good command of English, including the teaching staff, the administrative staff and students. This provides excellent framework for international cooperation and mobility.
6. RGNF has broad contacts with industry and private sector; however the activity related to fund-raising should be structured and aligned with the strategic goals of the Faculty.
7. The Panel noted a good climate at the Faculty at all levels.

## **DISADVANTAGES OF THE INSTITUTION**

1. Significant disadvantages of RGNF are objective and reflect global changes, when certain fields within the Faculty's area of expertise disappear from the market. This requires adjustments in the Faculty's strategy and shift towards emerging and developing directions.
2. RGNF needs faster turn-around from administrative planning to practical implementation of decisions.
3. Many critical deficiencies from the previous evaluation were not resolved.
4. RGNF has a high unemployment rate among graduates.
5. Drop-out of students is extremely high.

6. Practical training of students is insufficient, yet the Panel acknowledges reduced training possibilities during the economic recession.
7. ECTS credits do not reflect workload, and RGNF did not correct the situation despite acknowledging that the problem is very old. Inadequate ECTS credits result in an overload of both teaching personal and students.
8. Far too high teaching load for permanent staff and TAs limits time left for their research and complicates their mobility.
9. Internationalization is in general low, with a low level of international exchange in both directions.
10. Publication activity according to international standards is in general low (with few exceptions).
11. Reward system for excellence in teaching, academic performance and fund raising is insufficient, and exists only for publication activities.
12. A part of senior teaching staff has low commitment to academic excellence and mechanisms to engage them are absent.
13. RGNF has a very tight budget, with insufficient external fund-raising.
14. Laboratory equipment is old.
15. Laboratory space is too small for teaching.

## **LIST OF INSTITUTIONAL GOOD PRACTICES**

### **EXAMPLES OF GOOD PRACTICE**

1. Reward system for publication activities - however it should be expanded to reward excellence in other academic and teaching activities.
2. Collaboration with industry - however it should be restructured to serve the Faculty's strategy.
3. Collaboration with the Department for Archeology, Faculty of Humanities and Social Sciences - this initiative should be expanded to involve other faculties.
4. Introduction of E-learning system.
5. Support of learning competences for teachers, deductive training courses for TAs.
6. Creation of the Development Fund and support of conference participation.
7. Plans to initiate teaching courses in English.
8. Attempts to improve internationalization. Participation in a number of international projects.

9. Initiative on additional courses (“bridge-courses”) in math for newly enrolled students – however such courses should be regular and more extensive.
10. Established doctoral study programme evaluated in 2018.

## **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**

##### Positive:

- RGNF has a strong national position in a broad range of academic and engineering disciplines with a broad spectrum of topics, which include, and are not limited to, mining, petroleum and geological engineering, hydrogeology, applied geophysics, geology, soil research, environmental protection, geothermal energy and many other in applied geosciences. This secures adaptability of the Faculty to the changing market, such as disappearance of some traditional engineering disciplines in Croatia (especially in mining) and development of new scientific and business areas (such as alternative energy and CO<sub>2</sub> sequestration). RGNF recognizes its role at the national and international scene as reflected in the strategic plan.
- RGNF demonstrates a high level of activity in the preparation of documentation in accordance with the national and ASHE standards, including the strategic plan. RGNF has established the Quality Management Committee (QMC) with representation of the Faculty administration, staff, students and alumni. RGNF has also established the Ethical Committee. Major information on the Faculty activities and on admission criteria is sufficiently available at the Croatian and English websites.
- RGNF started publishing its own peer-review professional journal. The Faculty develops lifelong learning programmes, which includes organization of specialist seminars and summer schools.

##### Negative:

- The Panel finds that RGNF needs faster turn-around from administrative planning to practical implementation of decisions. There is no evidence for sufficient actions based on the adopted documents, in some cases the actions are unacceptably delayed and insufficient. The assessment criteria for the actual results of implementation of the long-term strategic planning are not clear.
- Fund-raising activity is not aligned with the Faculty's strategic goals in research and teaching.
- Feedback from the surveys is insufficiently used in practice.
- The panel considers that the participation of RGNF top administration in QMC (dean and vice-dean) creates a conflict of interest.

- RGNF has been evaluated 5 years ago. The panel finds the level of activity for this standard unsatisfactory. The major critics with specific recommendations for improvement have not been addressed and the major critical deficiencies have not been resolved in the past 5 years. To acknowledge that a certain number of previous recommendations have been implemented by the Faculty, the corresponding standard 1.2 is ranked between unsatisfactory and minimum level of quality, and the minimum level is given as the final grade. However, since the panel considers the overall situation as unsatisfactory, the panel unanimously decided to assign the overall ranking of the assessment area I as minimum level of quality.

### Recommendations for improvement

1. RGNF should make a notable change towards active and efficient implementation of the strategic plans and the Faculty Council decisions. The turn-around time between the actions and the decisions should be significantly reduced.
2. Criteria for assessment of practical implementations of decisions and the strategic plan should be established, as well as efficient mechanisms to control their implementation.
3. Feedback from the surveys should be used broader.
4. Fund-raising activities should be aligned with the strategic goals of the Faculty.
5. QMC should not include Faculty administration. It is recommended that QMC has broader representation of external experts, not employed by the Faculty, to ensure the Faculty development is in line with the changing social needs.
6. RGNF should address seriously all critics of the previous and present evaluations.
7. RGNF should start using plagiarism detection tools.
8. RGNF should actively involve broader participation of its employees in all types of Faculty activities.
9. RGNF should broaden the spectrum of activities for external professionals and extend programmes in lifelong learning.

### Quality grade

Minimum level of quality

## II. Study programmes

### Analysis

#### Positive:

- RGNF has a unique position in Croatia in training specialists in mining, petroleum and geological engineering.
- The general goals of all study programmes are in line with the mission and strategic goals of the Faculty. RGNF has clear rules on how the expected learning outcomes of the study programmes are delivered according to the Ordinance of Studying at Undergraduate and Graduate Studies.
- RGNF made a substantial effort within the TARGET project in revising qualification standards for undergraduate and graduate programmes in 2016 based on feedback on qualifications required at labour market.

#### Negative:

- Study programme remains largely unchanged for 20 years and therefore does not fully reflect recent changes at the labour market and in society needs. Incomplete correspondence between the learning outcomes and the competences required at the present-day labour market may explain a high unemployment level of the Faculty graduates. New qualification standards proposed in 2016 within the TARGET project are not yet implemented into the study programmes and curricula.
- The study programmes at RGNF partially overlap with several other study programmes within the same university.
- RGNF has an extremely high drop-out rate of students.
- ECTS credits do not reflect the actual student workload on many courses and are not the same at different departments of RGNF.
- Student practical work is insufficient and RGNF did not implement the recommendations from the previous re-accreditation panel to establish student practical work at the undergraduate level.

### Recommendations for improvement

1. Study programme should reflect changing professional standards and society needs, include graduate employment analysis and feedback from students ensuring that the programme is up to date.
2. RGNF should develop and implement the strategy for a fast and significant reduction of the student drop-out rate. RGNF should include regular pre-courses at the high-school level of knowledge for students who did not have such courses in high school.
3. New proposed qualification standards should be introduced into the revised study programmes and approved as soon as possible.

4. RGNF should work in contact with other faculties where similar study programmes exist, to ensure their minimal overlap but maximum collaboration in delivering similar subjects.
5. ECTS credits should be brought in accordance with the actual workload as soon as possible, should be revised continuously on an annual basis and based on feedback from students, teachers and stakeholders.
6. RGNF should increase student practice, particularly at the graduate level. Laboratory work hours and field practice should be increased substantially.

### Quality grade

Satisfactory level of quality

## III. Teaching process and student support

### Analysis

#### Positive:

- RGNF has dedicated and qualified teaching staff at all levels. Students have enough tutors and sufficient consultation hours. A part of teaching is based on students' laboratory and field work. RGNF regularly conducts analysis and gathers information on student progress. The Faculty introduced "bridge courses" for problem subjects with a high failure rate among students.
- Students are informed about available support services. The Faculty has a procedure for students with learning difficulties and disabilities and teachers are willing to help students from vulnerable and under-represented groups.
- The Faculty has signed international mobility contracts with several countries. Students have an opportunity to complete a part of their study abroad. The recognition of ECTS credits gained abroad is ensured.
- Incoming mobility is low in absolute numbers and in geographical coverage. Some courses can be delivered in English and some teachers are willing to organize classes in English. The Faculty website provides information in English.

#### Negative:

- RGNF makes formal steps to improve teaching process and student support, but the actions are insufficient and often do not reach the goal. Student drop-out rate is unacceptably high and apparently no actions have been undertaken to reduce it.
- Students are not satisfied with the form, content and duration of field work. Very few students are involved in external scientific and professional projects. No students are involved in numerous small-scale externally funded projects.



- RGNF has an unacceptably high unemployment rate among the graduates. It is unclear if students are fully informed about the Career centre and employment options. Students do not get feedback after the surveys.
- Incoming and outgoing international mobility is very low.

### Recommendations for improvement

1. Special strategy is needed to reduce the student failure percentage, and a control/feedback mechanism should be formulated and implemented.
2. RGNF should take actions for improving the format and content of field work and laboratory work, and for increasing its duration. Students should be broadly included in scientific, professional and externally funded projects.
3. Career opportunities should be better presented to students. The Faculty should critically analyse the situation on the labour market and take serious actions to increase the employment rate among the graduates.
4. The Faculty should take actions to become more attractive for foreign students through advertisements and should increase incoming mobility.
5. RGNF should implement plagiarism checking tools.

### Quality grade

Satisfactory level of quality

## IV. Teaching and institutional capacities

### Analysis

#### Positive:

- The student/teacher ratio is aligned with the relevant regulations and provides good teaching capacities. RGNF has dedicated teaching staff at all levels, has a good strategy for professional development of teachers, including didactical courses for teaching assistants and language courses.
- International mobility remains low, although RGNF undertakes formal steps for participation in ERASMUS+/CEEPUS international projects. RGNF supports conference travel expenses for teachers and students. The Faculty has staff allocated to support project proposals and international mobility.
- The valuable mineral/rock collection should be broadly advertised to increase visibility of the Faculty among stakeholders, general public and international scientific community.
- The instrument pool is very limited and old, and needs to be updated. The infrastructure will be improved through a VIRTULAB initiative.

- The library is in good shape. The collection of textbook literature is adequate and includes a limited number of foreign titles, including English titles. Teaching material is available in the protected Moodle Merlin e-Learning system. The library has a good, although non-systematic collection of high-profile international professional journals acquired through donations. Professional book collection includes both national and foreign titles, is small but adequate, and is regularly updated.
- RGNF has access to electronic professional library resources through services provided by the University of Zagreb. Access to full-text articles is limited and should be guaranteed for key international journals.

Negative:

- Teaching load is disproportional, and several teachers have an exceptionally high teaching workload. International mobility of the teaching staff is low, also because of a high teaching load.
- Laboratory equipment is old, should be extensively updated and used more extensively for teaching.
- RGNF is transparent in providing major information on its income and expenditures. Income is dominated by the guaranteed ministry contribution, while external funding for research projects is low.
- There is limited effort to raise independent funding from competitive sources. This results in an overall tight budget. The many small scale projects appear to drain resources from the scientific and teaching activities.

**Recommendations for improvement**

1. RGNF should take concrete actions for reducing high teaching workload and to ensure its appropriate distribution with account for high profile publications and fund raising.
2. Teaching excellence should be rewarded.
3. International mobility of teaching and research staff should be improved, in particular for long-term stays. New funding schemes should be looked for. RGNF should improve the involvement of international high-profile experts in teaching through a series of regular invited lectures and short courses at undergraduate, graduate, postgraduate level and professional development. The Faculty should develop a strategy for funding of maintenance and expansion of instrument pool and laboratories.
4. RGNF should continue to ensure subscriptions to leading high-ISI international professional journals and guarantee the access to full-text articles from the key journals.
5. RGNF should develop an application strategy for external academic research funding nationally and internationally, including large-scale EU funding schemes. They

should analyse if the many small scale project contracts contribute to the scientific and teaching activities of the faculty. If not, they should be terminated.

6. RGNF should develop a strategy of financial awards and promotion for academic and teaching excellence at all levels, starting from the student level.

### Quality grade

Satisfactory level of quality

## V. Scientific/artistic activity

### Analysis

#### Positive:

- The majority of RGNF staff is motivated to carry out high level research and teaching.
- RGNF has a long tradition of meeting the social and labour market needs in Croatia. Changing labour market conditions presents a serious challenge that has not yet been dealt with at an acceptable level.
- RGNF has made improvements in scientific research over the last five years, but at absolute international scale the overall situation remains unsatisfactory. The Faculty is regionally visible by publishing a local low impact journal, and organising regional scale conferences.
- A number of joint and collaboration research projects involving public and private sectors contributed to knowledge transfer and are of enhanced social relevance.
- RGNF has established 2 best paper awards to encourage scientific publication.

#### Negative:

- International visibility is low by publications, awards and memberships of boards and panels. The publication profile is dominated by local and regional publications. Ca. 80% of publications in the period 2013-2017 are in the very low impact journals outside of Q1-Q4. A large part of the senior academic staff has a very low publication rate. 25% of the senior academic staff (full and associate professors) published only 1 or 2 publications over a 5-year period mostly in low impact journals.
- The various externally funded projects are scattered in scope and subject with a lack of synergy effects. This drains the resources and distracts the staff from teaching and publications activities. Most of the many projects with the private sector are at a very low economic scale, appear as service contracts and may not contribute positively to the development of the Faculty's key areas. Students are

not involved in many external projects, research activities and collaboration projects.

- RGNF provides very little economic support to research, and little support to early career researchers for becoming internationally recognised scientists.

### Recommendations for improvement

1. RGNF must, as the first priority, create an international Advisory Board. The Board members should be selected in consultancy with national and international high level scientists.
2. RGNF should revise and enhance research profile regularly and consistently; adapt to the changing job market for its graduates; use the strategy actively to form new internal and external collaboration. RGNF should create a strategy for infrastructure renovation and investment.
3. Publication strategy should target internationally recognized, higher IF journals in order to increase the overall quality. RGNF should motivate the staff to publish in high-ISI journals and should introduce a more extensive reward system than presently. RGNF should implement targeted efforts for increasing its visibility at the international arena, in particular for its young scientists. A mechanism to activate the less-productive staff should be established and implemented.
4. The Faculty needs a short-term and long-term strategy for building up an effective strategical network to boost external funding of the core activities and to assess if small-scale projects may contribute positively to the overall strategic goals of the institute. RGNF should develop a strategy with a few large-scale, broadly oriented research programmes where the available expertise can contribute positively. This may lead to increased external funding.

### 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

- RGNF has prepared all documentation in accordance with the national and ASHE standards.
  - There is no evidence for sufficient actions based on the adopted documents.
- The Faculty strategy has been developed and formalised. The RGNF's strategic plan for research activity includes the description of the Faculty's strategic goal and major scientific themes.
  - The assessment criteria for the actual results of implementation of the long-term planning are not clear.
- Numerous external small-scale contracts are not aligned with the Faculty's strategic goals in research and teaching.
- RGNF has established the Quality Management Committee (QMC) which includes representatives of the Faculty management, academic/teaching staff, technical/administrative staff, one student representative and one alumni representative.
  - Until 21 September 2018, QMC included dean and vice-dean as members; presently vice-dean is a member of QMC. The panel considers that participation of RGNF top administration in QMC creates a conflict of interest.
- The Faculty made a SWOT analysis based on the analysis of the data they have collected.
  - The panel, in general, agrees with the SWOT analysis and notices that such critical deficiencies as low level of external funding, inadequate system of ECTS credits, high drop-out rate of students, and high unemployment rate of graduates are not reflected on the WT side of the analysis, while partnership and collaboration with other faculties and the exceptional mineral/rock museum are not reflected on the SO side.
- RGNF conducts regular surveys; many of them are organized centrally by the University.

- Feedback from the surveys among the employees and students is insufficiently used in the Faculty activities. No examples for improvements, based on the surveys, were presented.
- The Faculty has established the Development Fund and, among other things, uses it for providing financial support for participation of teaching and junior staff in professional conferences.
- The Faculty has started to implement the system of rewards for academic/teaching staff for a high publication performance.
  - The reward system is incomplete, does not cover all types of professional activities (is limited to publications only) and does not cover all groups of employees. No examples of continuous professional development of all categories of employees were presented.
- The Faculty has established a doctoral study programme that was evaluated in 2018.

### Recommendations for improvement

1. The Faculty has all required documental base, yet actions are insufficient and in some cases unacceptably delayed. The Faculty should make a notable change towards an active and efficient implementation of the strategic plans and the Faculty Council decisions.
2. The Faculty should encourage and promote an active and creative participation of the staff in development and implementation of the strategic plan.
3. The turn-around time between the actions and the decisions should be significantly reduced. The decisions, as reflected in the adopted documentations, should be followed by real actions.
4. The link between the decisions and the surveys should be strengthened. Feedback from the surveys should be used as guidance for practical actions.
5. QMC should not include Faculty administration to ensure that QMC provides unbiased quality assurance control. It is recommended that QMC has broader representation of external experts (such as alumni not employed by the Faculty), to ensure the Faculty development is in line with the changing social needs.
6. The reward system should be extended and broadened to cover all groups of employees and students, and to cover all major types of professional activities.

### Quality grade

Minimum level of quality

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

### **Analysis**

- RGNF has been evaluated 5 years ago. The major critics with specific recommendations for improvement have not been addressed. The uncorrected deficiencies include (numbers refer to the Re-accreditation report of July 2012):
  - Not implemented: 1.4; 1.6; 2.2; 2.3; 2.5; 2.9; 3.8; 4.3; 4.7; 4.8; 6.7.
  - Partially implemented: 1.7; 1.8; 1.9; 2.1; 3.1; 3.2; 3.3; 3.5; 3.9; 3.14; 4.5; 5.1; 5.3; 5.5.
- The panel finds the level of activity for this standard unsatisfactory, but having in mind that a certain number of previous recommendations have been implemented, ranks this standard at a minimum level of quality.

### **Recommendations for improvement**

To address in full all recommendations.

### **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**

- RGNF has appointed the Ethical Committee, but apparently there were no [recent] cases of unethical or discriminative behaviour.
- RGNF has no system for plagiarism check. Instead, written statements from students are requested as assurance of their ethical professional behaviour.

### **Recommendations for improvement**

1. To start using automated plagiarism detection tools.

### **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**

- RGNF's website provides sufficient information and reflects various aspects of the Faculty activities.

- The admission information presented on the internet is satisfactory and provides all that is needed. Information on study programmes is at an adequate level and covers all aspects.
- The English website exists and repeats major information from the Croatian website. However, information on research activities of the academic staff is absent (only empty placeholders exist), hindering international public information on RGNF activities, results and role in societal development.
- RGNF is engaged in outreach activities, yet each of the activities is at a minimum level. The Information Officer has been appointed and the Promotion Board was founded since the previous re-accreditation. The Faculty arranges Open Door days, has organised few visits to high schools, publishes a bi-lingual annual report, has public lectures and round-tables and holds a Career Day.
- Information provided to stakeholders is not fully complete, e.g. regarding graduate employment.

### Recommendations for improvement

1. The English website should include broader information on the RGNF activities, such as of relevance to the social needs and of interest to the private sector and academic community.
2. Outreach activity of each type should be regular, and not limited to a single or few events.

### Quality grade

Satisfactory level of quality

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

### Analysis

- RGNF prepares specialists in a broad range of engineering topics (petroleum, mining, geological), which are in high demand in society. However, national industry recession and global changes, especially in the mining sector, require adjustments of the Faculty strategy. The Faculty is gradually adjusting to these changes and has initiated new types of activities, such as in the areas of geothermal energy, waste management, environmental protection, CO<sub>2</sub> sequestration.
- RGNF has established contacts and collaborates with the private sector on professional issues, and certain professional activities were performed for the City of Zagreb.
- RGNF started publishing its own peer-review professional journal.



- No evidence was presented that RGNF encourages its employees and students in the development of its societal role.

#### Recommendations for improvement

1. Much of the activities are limited to a few RGNF staff members. The Faculty should actively encourage and involve a broader participation of its employees.
2. RGNF should continue adjusting its activities and professional training of students to the changing market.
3. The scope of the activities should be broadened.

#### Quality grade

Satisfactory level of quality

### **1.6. 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 Faculty has some activity in developing lifelong learning programmes. This primarily includes PEX seminars on anti-explosion protective equipment, the Petroleum engineering 2-week summer school which runs for ca. 30 years, and Dubrovnik international mining school (runs since 2016); one more summer school is under preparation. The activity level is insufficient.

#### Recommendations for improvement

1. RGNF should extend programmes in lifelong learning in order to improve skills, knowledge, and competences of their own teaching and academic staff, and students. This may possibly include English language courses.
2. There should be a broader spectrum of activity for external professionals.
3. A more extensive programme would also provide an additional income to RGNF and will increase its national and international visibility.

#### Quality grade

Satisfactory 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 general goals of all study programmes are in line with the mission and strategic goals of the Faculty, as indicated by a comparison of the current study programmes and the Development Strategy for 2017-2021 (which is a continuation of the previous Strategies). The main goal of the Strategy is to develop the study programmes based on the learning outcomes that reflect the needs of labour market and the needs of society, according to the Croatian Qualifications Framework (CroQF), as stated in strategic sub-objective 1.1.
- The Faculty is the only HEI in Croatia that offers study programmes in mining, petroleum and geological engineering. This places RGNF at a unique position by training specialists that are needed by society and industry.

#### Recommendations for improvement

None.

#### Quality grade

High 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

- RGNF has clearly defined learning outcomes for both undergraduate and graduate study programmes. The description of the overall knowledge and competences that students achieve in different courses is complete.
- According to available information, student achievements are generally at the level expected by the Croatian Qualifications Framework.
- Comparison of the present study programme with the programme changes over the past ca. 20 years showed minimal level of changes. As a result, the study programme in general is not up to date and does not reflect changes in labour market and society needs.
- No examples were presented if graduate employment analysis is performed and if its analysis and feedback from students are used in adjustments of study programmes.

- The panel finds information on the competences of the graduates controversial. Several potential employers from the public and private sectors, with whom the panel met during the site visit, expressed satisfaction with the level of knowledge by the Faculty graduates. On the other side, a very high unemployment level of the Faculty graduates casts doubts that the study programme provides sufficient competencies for employment.

### Recommendations for improvement

1. Study programmes should reflect changing professional standards and society needs include graduate employment analysis and feedback from students ensuring that the programme is up to date.
2. The new proposed qualification standards should be incorporated into the study programme as soon as possible.

### 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

- RGNF has clear rules on how learning outcomes of the study programmes are delivered according to the Ordinance on Studying at Undergraduate and Graduate Studies.
- Feedback from both students and teachers during the site visit indicates that various mechanisms to test students' knowledge generally follow the procedures.
- RGNF has an extremely high drop-out rate of students, with many students delayed in studies due to failure at exams.
- RGNF made some efforts to improve the situation by introducing short preparatory courses on subjects with known passing problems. However, such courses are not performed on a regular and continuous basis, and seem to be too short to improve substantially the students' background knowledge.

### Recommendations for improvement

1. RGNF should continually revise and improve the teaching process on the basis of evidence on the achievement of the intended learning outcomes. This should include changes to lectures and other forms of teaching, including more student-centred learning methods, with feedback to those who fail at tests.
2. RGNF should include regular pre-courses at the high-school level of knowledge for students who did not have such courses in high school.

3. RGNF should develop and implement the strategy for a fast and significant reduction of the student drop-off rate.

### Quality grade

Satisfactory level of quality

## **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.**

### Analysis

- RGNF has a strategy to revise and change the study programme and it should be done systematically and by involving stakeholders and students.
- RGNF made a substantial effort within the TARGET project (called Establishment of higher education qualification standard and occupations in the mining, geology and chemical (petroleum) technology sectors). In this effort, RGNF analysed feedback from industry in assessing knowledge and skills required on the labour market, and in 2016 incorporated this into proposals for the qualification standards for undergraduate and graduate programmes.
- However, the proposed qualification standards have not yet been implemented into the study programmes and curricula.
- RGNF publishes up-to-date versions of the study programmes in both Croatian and English.
- The study programmes at RGNF partially overlap with several other study programmes within the same university. The intention of the Faculty is to profile their study programme in a new, more specific direction of environmental engineering.
- During the site visit, students confirmed that no student surveys were made to get information on possible changes to the study programme.

### Recommendations for improvement

1. New proposed qualification standards should be introduced into the revised study programmes and approved as soon as possible. Decisions should be followed by actions without delay.
2. RGNF should work in contact with other faculties where similar study programmes exist, to ensure their minimal overlap but maximum collaboration in delivering similar subjects.
3. RGNF should conduct surveys between students and external stakeholders on a possible need to modify the study programme.

### Quality grade

Minimum level of quality

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

### Analysis

- ECTS have been allocated to the courses in 2005/2006 when a new study programme was formalized according to the Bologna process. Since then no significant changes were made. The panel expects that ECTS should have been revised continuously over the past 13 years.
- In general ECTS credits are too low compared to the teaching load. Substantial number of students and teachers feel that ECTS credits do not reflect the actual student workload on many courses.
- For the same course, ECTS credits are different at different departments of RGNF. For student practice, ECTS are credited at one of the RGNF departments, but are not credited at the other RGNF department where student practice is twice longer.
- RGNF administration confirmed during the site visit that they have been aware of the problem for several years. They plan to address the problem in this academic year (2018/2019).

### Recommendations for improvement

1. ECTS credits should be brought in line with the actual workload as soon as possible.
2. ECTS should be revised continuously on an annual basis and RGNF should use feedback from students, teachers, stakeholders and external professionals in the environmental engineering.
3. RGNF should initiate annual surveys among students and teachers on the actual workload.

### Quality grade

Unsatisfactory level of quality

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

### Analysis

- Student practice exists at the undergraduate level at Mining Engineering and Petroleum Engineering departments, but not at Geological Engineering. No MS student practice exists except for Mining Engineering department.

- RGNF did not implement the recommendations from the previous re-accreditation panel to establish student practical work at an undergraduate level.
- The majority of students and a substantial part of teachers finds the level of practical work in laboratory, during field practice and industry internship, to be very low and strongly insufficient, making them feel that they are not prepared enough for the labour market upon graduation. The panel recognizes practical difficulties in organizing student field and industry practice during the economic recession.
- ECTS points are not allocated to the existing student practice at Mining Engineering at both BS and MS levels.

### Recommendations for improvement

1. RGNF should increase student practice, particularly at the graduate level, and include it to every course where it is applicable. Hours spent on laboratory work should be increased substantially.
2. RGNF should include into study programme, at both the undergraduate and graduate levels, field work with active assignments and establish short visits to regional companies dealing with different aspects of the environmental protection.
3. ECTS points should be allocated consistently to student practice and internship.
4. Student practice may be offered as an optional course at the undergraduate study to allow for a closer cooperation of students with the labour market.

### Quality grade

Unsatisfactory 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

- Both general criteria exist, and they are published on the web pages.
- Student drop-out rate is unacceptably high and actions should be undertaken to reduce it.
- The Faculty organizes an Open Day to improve student recruitment. However, further actions are required in this direction. On-site discussions showed that a significant number of students did not make RGNF their 1<sup>st</sup> choice.
- Previous evaluation recommended to increase the number of students in order to bring the student-teacher ratio closer to the European average. RGNF did not change the admission quota in 5 years since the previous evaluation. The panel does not find it necessary to increase the student-teacher ratio, which appears to be healthy. On the contrary, the panel feels that the admission quota may be reduced if it may help to reduce the student drop-out ratio.

### Recommendations for improvement

1. The student failure percentage must be reduced. Special strategy is needed, and a control/feedback mechanism should be formulated and implemented.
2. The Faculty should work on improving the admission and continuation criteria through the analysis of the exam pass rates and the student drop-out rates.
3. Admission criteria should be adjusted to solve the problem with a high student drop-out rate and a low exam pass rate.
4. The Panel recommends to consider if the admission quota may be reduced, because the percentage of failed students corresponds to the number of those for whom RGNF was not the first choice; however, the link between the two numbers may not be direct.

### Quality grade

Satisfactory 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

- The Faculty regularly conducts analysis and gathers information on student progress, but does not initiate necessary actions accordingly.
- For many years RGNF has had an unacceptably low pass rate and low completion rate.
- The Faculty introduced “bridge courses” but they did not achieve their goal and bridge courses are not held regularly (the last one was 2 years ago).
- The measures taken to increase the pass rates and decrease the drop-out rate are insufficient and not effective.

#### Recommendations for improvement

1. The Faculty should critically analyze the high drop-out rate and low completion rate and take serious measures and start activities to increase both the pass rates and the completion rates.
2. Bridge courses for subjects with a low pass rate should be regularly conducted. Alternative courses should also be considered.

#### Quality grade

Minimum level of quality

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

#### Analysis

- RGNF has dedicated and qualified teaching staff at all levels.
- Teachers are willing to adapt their teaching methods to a diverse student population.
- Exercises with teaching assistants are well performed and encourage interactive learning.
- E-courses are at a high level.
- A part of teaching is based on students laboratory work; some courses include students’ field work. Students are not satisfied with the form, content and duration of field work.
- Very few students are involved in external scientific and professional projects. No students are involved in numerous small-scale externally funded projects.
- Students do not get feedback after the surveys.

#### Recommendations for improvement

1. RGNF should take actions for improving the format and content of field work and for increasing its duration.



2. Students should be broadly included in scientific, professional and externally funded projects.

#### Quality grade

Satisfactory level of quality

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

#### Analysis

- Students have enough tutors and sufficient consultation hours.
- According to the RGNF administration, students are informed about available support services. However, students are uncertain about the existence of the Career centre and employment options. Students' opinion is in line with a high unemployment rate among the RGNF graduates.
- The Faculty has defined the procedure for students with disabilities.
- Teachers adapt their teaching to students with learning difficulties and disabilities. However, presently there are no such students.
- The building has been adapted for students with disabilities.
- There is a controversy about the library service hours for students. Currently the open hours fall on the lecture time, which hampers the possibilities of students to use the library. According to the librarian, at some point the library hours were extended until later time, but students did not use this opportunity for the library service. At the same time, presently students complain that the library hours do not suit them.

#### Recommendations for improvement

1. Career opportunities should be better presented to students.
2. The panel suggests to establish an open dialogue between RGNF administration, the library, and students to solve the apparent problem with the library open hours. Perhaps, student assistants may be affiliated with the library to extend its service hours.

#### Quality grade

Satisfactory level of quality

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

#### **Analysis**

- Teachers are willing to help students from vulnerable and under-represented groups (none are currently enrolled), and they are willing to adapt their teaching to students from such groups.

#### **Recommendations for improvement**

None. The Panel is satisfied with the Faculty activities.

#### **Quality grade**

High level of quality

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

#### **Analysis**

- Incoming and outgoing international mobility is very low.
- Students have an opportunity to complete a part of their study abroad.
- The Faculty has signed international mobility contracts with several countries.
- The recognition of ECTS credits gained abroad is ensured.
- Mobility (Erasmus Programme) is limited by quotas from the University of Zagreb (ca. 2% per year). No actions are undertaken to increase mobility through other mechanisms.
- Mobility of teachers is limited by a high teaching load and limited HR.
- There is a very limited number of foreign lecturers.

#### **Recommendations for improvement**

1. The Faculty should work on promoting international mobility and encouraging students.
2. The Faculty should take actions for improving mobility by finding alternative options for international exchange visits of students.
3. The Faculty should increase the number of visiting foreign visitors and lecturers.
4. The Faculty should promote international mobility by organizing presentations by students who stayed abroad.

### Quality grade

Satisfactory level of quality

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

### Analysis

- Incoming mobility is low in absolute numbers and in geographical coverage.
- The Faculty web page provides information in English.
- Some courses can be delivered in English, and some teachers are willing to organize classes in English.
- There is a controversy about possible courses in English. The teachers believe that the students' command of English is insufficient to follow courses in English. Students believe that the teachers' command of English is insufficient to deliver courses in English.
- The Panel noticed that everyone (administration, teachers and students) have fluent English.

### Recommendations for improvement

1. The Faculty should take actions to become more attractive for foreign students through advertisements and should increase incoming mobility.
2. The panel suggests to establish an open dialogue between RGNF teachers and students to address the controversy about teaching in English. Perhaps, English courses may be offered to teaching staff as lifelong learning. Students expressed the wish to have English not one in semester, but at least in two semesters.

### Quality grade

High level of quality

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

### Analysis

- Junior teaching staff acknowledged that RGNF provides them with some pedagogical training. The panel considers this a good practice.
- The Faculty collects information on student performance according to the regulations.
- Feedback to students regarding the evaluation results is incomplete.
- Plagiarism is not checked.

- The panel is not sure how the Faculty ensures objectivity and reliability of grading, since exams are handled by just one teacher. Some students commented on this problem. The panel cannot exclude an occasional lack of objectivity at exams, but also hesitates to consider students' information as objective. The panel was not presented with information on the appeal procedure.

#### Recommendations for improvement

1. To implement plagiarism checking tools.
2. To establish a clear and open procedure for student appeals.
3. To maintain pedagogical training of junior teaching staff.

#### Quality grade

Satisfactory level of quality

### **3.9. The higher education institution issues diplomas and Diploma Supplements in accordance with the relevant regulations.**

#### Analysis

Diplomas and Supplements are in accordance with regulations, contain all necessary information and are available both in Croatian and in English.

#### Recommendations for improvement

None.

#### Quality grade

High level of quality

### **3.10. The higher education institution is committed to the employability of graduates.**

#### Analysis

- RGNF has an unacceptably high unemployment rate among graduates.
- Contact with ALUMNI exists, but the resources of ALUMNI employed in the public, private and civil sectors are not used well.
- The Faculty organises a Career Day, but overall activities are insufficient.

#### Recommendations for improvement

1. The Faculty should critically analyse the situation on the labour market and take serious actions to increase the employment rate among the graduates.

2. The Faculty should use contact with ALUMNI and their resources to increase the employment rate.
3. The Faculty should establish a Job Fair.

#### Quality grade

Unsatisfactory level of quality

## IV. Teaching and institutional capacities

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

#### Analysis

- The number of teachers is appropriate for the delivery of study programmes and for the intended learning outcomes.
- The student-teacher ratio is aligned with the relevant regulations and provides good teaching capacities.
- Several teachers have an exceptionally high teaching workload. This does not ensure an appropriate distribution of teaching, scientific activities and administrative duties.
- High teaching loads negatively affect the time dedicated to scientific research and mobility of teaching staff.

#### Recommendations for improvement

1. To monitor the number of teachers and the student-teacher ratio to ensure that these indicators continue to be in accordance with the relevant legislation and provide adequate teaching capacities.
2. To take concrete actions for reducing teaching workload when it is very high and to ensure appropriate distribution of the teaching workload with account for high profile publication and fund-raising activities.

#### Quality grade

Satisfactory level of quality

### 4.2. Teacher recruitment, advancement and re-appointment is based on objective and transparent procedures which include the evaluation of excellence.

#### Analysis

- Teacher recruitment, advancement and re-appointment procedures follow official regulations.

### Recommendations for improvement

1. To continue selection, appointment and advancement of teachers in accordance with legislation, internal regulations and with account for important professional achievements of candidates to improve excellence in research and teaching.
2. To develop a transparent action plan for new recruitment and professional advancement in relation to expected retirements.

### Quality grade

High level of quality

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

#### Analysis

- Teaching personnel is knowledgeable and dedicated at all levels. However, RGNF has neither a strategy nor a practise for the recognition and motivation of excellence in teaching.
- RGNF provides opportunities for the teaching staff to improve their competence in teaching methods. RGNF has a good strategy for the professional development of teachers, including didactic courses for teaching assistants and language courses.
- RGNF participates in ERASMUS+/CEEPUS international projects. RGNF supports conference travel expenses for teachers and students. However, international mobility of teaching staff is low and not at the level of international high-profile institutions. The system of sabbatical leaves is present in theory, but not in practice because of a high teaching workload.
- The Faculty has a small group of very active researchers with a very strong publication record. There does not seem to be a transparent strategy for professional promotion of these active researchers, nor for reduction of their teaching load.

### Recommendations for improvement

1. To analyse the reasons for low international mobility; to undertake actions to increase international mobility of teaching and research staff, in particular for long-term stays.
2. To improve the involvement of international high-profile experts in teaching through a series of regular invited lectures and short courses at undergraduate, graduate, postgraduate and professional levels.

3. To increase scientific visibility of RGNF through an increased number of publications by all staff members in high-ISI international peer-review journals; to engage low performing senior teaching staff.
4. To continue to ensure adequate support by teaching assistants to all courses.
5. To introduce a reward system for excellence in teaching.

### Quality grade

Satisfactory level of quality

**4.4. 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

- Development of laboratory capacities is needed to ensure the intended learning outcomes and proper implementation of scientific activities. Instrument pool is very limited and old, and needs to be updated. VIRTULAB is a positive initiative, which, in the future, will substantially improve the infrastructure.
- The Faculty carries a huge number of small-scale projects, which are intended to cover a part of the experimental running costs. These projects disperse the efforts and are not in line with the strategic plan of RGNF. Little efforts are made to increase dedicated fund raising for renovation of the laboratory equipment.
- Laboratory spaces are small with a negative effect on the delivery of students' practical activities.
- RGNF is working on the improvement of work facilities and IT services. A computer park is limited and largely old.
- The valuable mineral/rock collection should be valorised to increase the visibility of the Faculty among stakeholders, the general public and the international scientific community.

### Recommendations for improvement

1. Laboratory equipment should be extensively updated and should be used more extensively for teaching.
2. Income from sizable industrial projects should be dedicated to the renovation of laboratories and equipment.
3. RGNF may encourage alumni, public sector, and county administration to contribute to targeted updates of infrastructure.

4. RGNF should take actions to increase the visibility of an excellent mineral/rock collection.

### Quality grade

Minimum level of quality

#### **4.5. 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

- The library is in a good shape, with a 30-seat reading room equipped with computers.
- The library provides professional librarian services. Opening time is only during lessons.
- The collection of textbook literature is adequate and includes a limited number of foreign titles, including English titles. Part of textbook literature is old and needs extension with new and up-to-date titles. Teaching material is available in the protected Moodle Merlin e-Learning system. The collection of graded works (final, graduate, master and doctoral theses) is adequate.
- The library has a good, although non-systematic collection of high-profile international professional journals acquired through donations. Professional book collection includes both national and foreign titles, is small but adequate, and is regularly updated.
- RGNF has access to electronic professional library resources through services provided by the University of Zagreb, which includes access to WoS, Science Direct, etc. Access to full-text articles is limited and should be guaranteed for the key international journals.

##### Recommendations for improvement

1. Students' access to the library should be possible outside the teaching hours.
2. New systematic and regular library acquisitions should be guaranteed, in particular for new international textbooks.
3. Professional literature in English, both books and textbooks should be improved.
4. RGNF should continue to ensure subscriptions to leading high-ISI international professional journals and guarantee the access to full text articles from the key journals.
5. RGNF should improve the digital collection of international scientific journals and books.



## Quality grade

Satisfactory level of quality

### 4.6. The higher education institution rationally manages its financial resources.

#### Analysis

- RGNF is transparent in providing major information on its income and expenditures. Income is dominated by the guaranteed ministry contribution, while external funding for research projects is low.
- There is limited effort to raise independent funding from competitive sources. This results in an overall tight budget where almost no financial resources are available beyond the wage payments and even maintenance costs are difficult to cover.
- RGNF has many project contracts with industry but the total income for research is relatively low. Instead, most of these projects are small and give the impression of service contracts with industry, mainly in the explosion laboratory. A few contracts with private enterprises have some volume and research content.
- The many small scale projects appear to drain resources from the scientific and teaching activities.
- The Faculty has staff allocated to support project proposals and international mobility.
- About 79% of funding comes from public sources, 1% from scholarships and fees, ca. 11% from scientific and professional projects (includes service projects to industry), and 9% from other sources.
- Expenditures include about 84% for employees' salaries, about 3% to scientific projects (mainly travel and training) and the remaining costs are for infrastructure, materials and service expenses. Library costs are marginal.

#### Recommendations for improvement

##### On the income side:

1. Extend and expand the national and international professional network to boost RGNF involvement into academic funding at a reasonable volume;
2. Develop a strategy for application for external academic research funding nationally and internationally, including large-scale EU funding schemes;
3. Analyse if the many small scale project contracts contribute to the scientific and teaching activities of the Faculty and are in line with the strategic plan. If not, they should be terminated.
4. Introduce incentives to scientists who apply for external funding for scientific and teaching projects.

On the expenditure side:

1. Increase international mobility;
2. Allocate funds for attracting high-profile academic visitors;
3. Develop a strategy of financial awards and promotion for academic and teaching excellence at all levels, starting from the student level;
4. Develop a strategy for funding of maintenance and expansion of instrument pool and laboratories.

### 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

RGNF currently has 63 higher academic staffs (24 professors, 12 Assoc. professors and 27 Assistant professors). The panel judges that the majority of this staff is motivated to carry out high level research and teaching. The panel noted that RGNF has made improvements in scientific research over the last five years, but at absolute international scale the overall situation remains unsatisfactory.

#### Positive aspects:

- The total number of publications in the period 2013-2017 is 1425, of which 190 are in the “highest category” and 98 are in Q1-4.
- The total number of publications in Q1 has increased from 5 to 10 annually.
- RGNF has established 2 best paper awards to encourage scientific publication.

#### Negative aspects:

- The general quality of the publications is of a low standard in terms of journal IF, citations, personal impact factors and h-index.
- Ca. 80% of 1425 publications in the period 2013-2017 are in the very low impact journals outside of Q1-Q4.
- A large part of the senior academic staff has a very low publication rate.

- The panel considers it unacceptable that 4 full and 5 associate professors (that is 25% of the senior academic staff) published only 1 or 2 publications over the 5-year period mostly in low-impact journals.

### Recommendations for improvement

1. Publication strategy should target internationally recognized, higher IF journals in order to increase the overall quality.
2. The Faculty should introduce a more extensive reward system than presently.
3. RGNF should motivate the staff to publish in high-ISI journals; they should avoid double publication because initial first publications may block later high-profile publication.
4. A mechanism to activate the less-productive staff should be established and implemented.
5. International presence (conference, workshop, etc.) should be increased.
6. An academic writing course may be introduced for the staff.

### 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

- RGNF has a long tradition for meeting the social and labour market needs in Croatia. However, changing conditions on the labour market have removed many of the traditional jobs for graduates from RGNF, which presents a serious challenge that has not yet been dealt with at an acceptable level.
- There have been a number of joint and collaboration research projects involving public and private sectors, contributing to knowledge transfer and of enhanced social relevance. However, most of the many projects with the private sector are at a very low economic scale and may not contribute positively to the development of the Faculty's key areas.
- The various projects are scattered in scope and subject which appears to lead to a lack of synergy effects. This drains the resources and distracts the staff from teaching and publications activities.
- The publication profile, by far, is dominated by local and regional publications with the negative effect that publications in international journals are very rare.
- RGNF provides very little economic support to research.

- The Faculty provides little support to early career researchers for becoming internationally recognised scientists.

### Recommendations for improvement

1. RGNF should implement targeted efforts for increasing its visibility at the international arena, in particular for its young scientists.
2. The faculty needs a strategy for building up an effective strategical network to boost fund-raising.
3. RGNF should adapt to the changing job market for its graduates.
4. The faculty should make a strategy for how small scale projects may contribute positively to the overall strategic goals of the institute, instead of just providing small additional incomes; if not possible, it may be better to close the programme.
5. RGNF should develop a strategy with a few large-scale, broadly oriented research programmes where the available expertise can contribute positively. This may lead to increased external funding.
6. RGNF should develop a broader reward system than today.

### Quality grade

Minimum 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

- RGNF has shown some progress during the past years in terms of increased acknowledgement of its work. However, the examples are few and at a regional standard compared to the international level. This is, of course, closely related to the low scientific publication activity that needs to be enhanced.
- RGNF is visible regionally. Teachers and researchers receive national awards and are invited to give presentations at regional meetings. The Faculty is visible in organising regional scale conferences. The Faculty is regionally visible by publishing a local low impact journal, where some staff members are on the editorial board.
- The Faculty is not sufficiently visible internationally by publications, awards and memberships of boards and panels.
- The Faculty misses the opportunity of building its international visibility by supporting some exceptional publication activities and by promoting the role models through the creation of e.g. core groups of excellence around exceptionally productive staff members.

### Recommendations for improvement

1. RGNF should place more focus on increasing the numbers of high IF publications; on more active participation in international missions such as conferences.
2. RGNF should boost both incoming and outgoing mobility at all levels and should increase focus on inviting international professors to visit RGNF and give guest lectures.
3. RGNF must, as the first priority, create an international Advisory Board. The Board members should be selected in consultancy with national and international high level scientists.

### Quality grade

Minimum level of quality

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

### Analysis

- RGNF has a strategy for its activities aligned with the requirements of the university vision.
- The economic and instrumental resources for the activities are too limited for a high-level performance. The basic infrastructure is at a low level and needs update/maintenance.
- The Faculty does not provide adequate economic support to the various activities, reasoned in non-availability of funding.
- The Faculty provides limited reward to its best scientists. However, in some cases no reward has been given to the highest ranking scientists at RGNF.

### Recommendations for improvement

1. Create a short-term and long-term strategy for external funding of the core activities.
2. Create a strategy for infrastructure renovation and investment.
3. Revise and enhance research profile regularly and consistently.
4. Use the strategy actively to form new internal and external collaboration.

### 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**

- Research equipment is used for teaching, although certified laboratories cannot be used for teaching.
- The teaching reflects the research and professional activities of the Faculty members.
- Students could be more involved in the research activities and collaboration projects.
- Students are not involved in many small-scale external projects with industry.

### **Recommendations for improvement**

1. Set up and implement a clear strategy to enroll more motivated, better-qualified students, who can bring RGNF to a higher level.
2. Set up and implement a clear strategy to recruit international, young talent to ensure the sustainable development of RGNF.
3. Involve students more than at present in the research activities of various types.

### **Quality grade**

Satisfactory level of quality

## **APPENDICES**

### **I. Quality assessment summary - tables**

### **II. Site visit protocol**

## I. 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		

## *Quality grade by standard*

<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	
1.6. 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>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.				<b>X</b>
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.			<b>X</b>	
2.3. The higher education institution provides evidence of the achievement of intended learning outcomes of the study programmes it delivers.			<b>X</b>	
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.		<b>X</b>		
2.5. The higher education institution ensures that ECTS allocation is adequate.	<b>X</b>			
2.6. Student practice is an integral part of study programmes (where applicable).	<b>X</b>			

### *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.			<b>X</b>	
3.2. The higher education institution gathers and analyses information on student progress and uses it to ensure the continuity and completion of study.		<b>X</b>		
3.3. The higher education institution ensures student-centred learning.			<b>X</b>	
3.4. The higher education institution ensures adequate student support.			<b>X</b>	
3.5. The higher education institution ensures support to students from vulnerable and under-represented groups.				<b>X</b>
3.6. The higher education institution allows students to gain international experience.			<b>X</b>	
3.7. The higher education institution ensures adequate study conditions for foreign students.				<b>X</b>
3.8. The higher education institution ensures an objective and consistent evaluation and assessment of student achievements.			<b>X</b>	
3.9. The higher education institution issues diplomas and Diploma Supplements in accordance with the relevant regulations.				<b>X</b>
3.10. The higher education institution is committed to the employability of graduates.	<b>X</b>			

### *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.			<b>X</b>	
4.2. Teacher recruitment, advancement and re-appointment is based on objective and transparent procedures which include the evaluation of excellence.				<b>X</b>
4.3. The higher education institution provides support to teachers in their professional development.			<b>X</b>	
4.4. 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.		<b>X</b>		
4.5. 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.			<b>X</b>	
4.6. The higher education institution rationally manages its financial resources.		<b>X</b>		

### *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	

## II. Visit protocol

<b>Monday, 19th November 2018</b>	
<b>15:00 – 21:00</b>	Expert Panel meeting – short presentation of ASHE, introduction to the higher education system in Croatia, Training for the expert panel members – introduction to the re-accreditation procedure, standards for the evaluation of quality and writing the final report. Preparation of the expert panel members for the site visit (working on the Faculty documents).

<b>Tuesday, 20th November 2018</b>	
<b>9:00 – 10:00</b>	Meeting with the dean, vice deans and secretary
<b>10:00 – 10:15</b>	Internal meeting of the Panel members
<b>10:15 – 11:15</b>	Meeting with the working group that compiled the Self-Evaluation, The Faculty Quality Management Committee The Quality and Information Management Office.
<b>11:15 – 11:30</b>	Internal meeting of the Panel members
<b>11:30 – 12:30</b>	Meeting with full-time employed teachers (open meeting)
<b>12:30 – 13:15</b>	Meeting with the students
<b>13:15 – 15:00</b>	Working lunch
<b>15:00 – 16:00</b>	Meeting with the Alumni
<b>16:00 – 17:00</b>	Organisation of additional meeting on open questions, if needed
<b>17:00 – 20:00</b>	Expert Panel meeting, discussion about site-visit

<b>Wednesday, 21<sup>st</sup> November 2018</b>	
<b>9:00 – 9:45</b>	Meeting with the Vice-Dean for Education and Student Affairs
<b>9:45 – 10:45</b>	Meeting with teaching assistants
<b>10:45 – 11:00</b>	Internal meeting of the panel members
<b>11:00 – 11:45</b>	Meeting with the vice dean for research

<b>11:45 - 12:45</b>	Meeting with the heads of research projects
<b>12:45 - 14:15</b>	Working lunch
<b>14:15 - 15:15</b>	Internal meeting of the panel members (document analysis)
<b>15: 15 - 16:00</b>	Meeting with external stakeholders -representatives of professional organisations, business sector/industry sector, professional experts, non-governmental organisations, external lecturers
<b>16:00 - 17:00</b>	Organisation of additional meeting on open questions, if needed
<b>17:00 - 20:00</b>	Expert Panel meeting, discussion about site-visit

<b>Thursday, 22nd November 2018</b>	
<b>9:00 - 10:30</b>	Tour of the Faculty (library, student services, international office, IT services, classrooms) and participation in teaching classes
<b>10:30 - 11:30</b>	Internal meeting (document analysis, if needed)
<b>11:30 - 12:30</b>	Organisation of additional meeting on open questions, if needed
<b>12:30 - 13:00</b>	Exit meeting
<b>13:00 - 15:00</b>	Working lunch

<b>Friday, 23th November 2018</b>	
<b>09:00 - 13: 00</b>	Final Report Draft

## SUMMARY

RGNF has a strong national position in a broad range of academic and engineering geoscience disciplines. RGNF has a long tradition for meeting the social and labour market needs in Croatia and it is the only faculty in Croatia that educates engineering specialists in mining, petroleum industry and geology. Recently, changing conditions on the labour market have removed many of the traditional jobs for graduates from RGNF, which presents a serious challenge that has not yet been dealt with in full. To address these emerging challenges, RGNF made a shift to the development of new scientific and business areas.

This shift, however, is not reflected in the teaching strategy, and the teaching curricula are largely unchanged for about 20 years. Practical student training in the laboratory facilities, in the field and at engineering objects remains at a low level, and may be a contributing factor to the small number of first-choice new students and the high unemployment rate of graduates.

The Faculty has a dedicated teaching staff which provides largely adequate student support. In turn, the Faculty's support of its teaching and academic staff is limited. A reward system has been introduced for a limited number of professional activities, but some of the most active researchers do not appear to be properly recognized and supported by the Faculty. The Faculty provides some financial support for conference participation both to senior and junior staff, however international long-term mobility is at an extremely low level. It seems to be hampered by 2 major factors:

- (i) A very high teaching load of the academic staff and
- (ii) Low quota limitations established by the University of Zagreb for the Erasmus Programme.

The Faculty makes some steps to increase international mobility, but no systematic actions are undertaken to increase outside mobility.

A very high and often disproportional teaching workload hampers not only international mobility of the teaching staff, but also limits their time for academic research, publications, and fund raising. High teaching load seems to be rooted in 2 problems:

- (i) Inadequate ECTS credits, which the Faculty is aware of for years but takes no action; this leads to work overload of both teachers and students, and reduces academic performance of a large proportion of students, leading to a huge drop-out student rate;
- (ii) High admission quota for students which does not line up with a high drop-out rate and a very high unemployment rate of the graduates.

Admission of a large number of insufficiently prepared students leads, in turn, to the need of introducing special preparatory courses for freshmen (bridge courses), which further increases the teaching load. High admission quotas appear to be dictated by a poor economic basis of RGNF, where most funding comes from the government with a very small proportion of external funding.

RGNF has some external grants, including a small number of peer-review academic grants. However, the total amount of external funding is very small with 2 major negative consequences:

- (i) Poor experimental base with old equipment, when even the running costs should be covered by providing external services;
- (ii) This situation forces the research staff to apply for numerous small-scale industry grants that are not directly within the strategic plan of the Faculty development, and reduce the time that the research staff can dedicate to academic and teaching activities.

Insufficient time for research, low international mobility and a general traditional culture of low publication activity, mostly restricted to low impact regional journals, hampers international visibility of RGNF. Although certain improvements have been achieved over the past 5 years, the level of academic productivity is very low by international standards and ca. 80% of all publications in the last 5 years were outside of international Q1-Q4 journals. Together with the fact that 25% of senior academic staff is nearly idle during the last 5 years, it creates an unhealthy academic culture. On the other side, RGNF has few researchers of exceptional productivity and the Faculty should provide them with a full-scale support and promotion as role models for junior researchers, which may be an important step in creating an international-level academic culture.

RGNF takes various steps to improve the overall performance of the Faculty, which has a complicated administrative structure to manage relatively simple administrative tasks. It appears that the resources and knowledge of external stakeholders are not sufficiently activated, while instead quality control on the Faculty operation is largely maintained by the management itself, which has seats in the Quality Management Committee. There is a very slow practical implementation of administrative decisions and a large delay time between the decisions and actions, and this may also explain why a substantial part of 5-year old recommendations have not been implemented at all, or have been implemented only in part.

**In summary, the key problems identified by the panel include:**

- 1) Unacceptably high drop-out rate of students, which causes unnecessary overload of the teaching staff, financial burden to the country, and drains away young generation from the labour market. This problem seems to be closely related to high admission quotas.
- 2) Unacceptably high unemployment rate of the graduates, which may be related to insufficient practical training, poor career orientation, and a lack of modification in the teaching curricula under the changing labour market conditions.
- 3) High and disproportional teaching workload, largely due to inadequate ECTS, which have not been updated for 12 years, despite the fact that the problem has long been known.



4) Inefficient implementation of administrative decisions, when the same group of people takes part both in decisions and in control of their implementation.

5) Insufficient level of internationalization, including both incoming and outgoing long-term mobility.

6) Low level of external funding, which is significantly hampered by low academic productivity at an international scale.

7) Insufficient level of research publications in high-profile international journals.

**To help RGNF to solve these key problems, the panel strongly advises to form an Advisory Board with participation of foreign professional high-profile experts.**

**The panel also recognizes the achievements and positive efforts by RGNF:**

1) Strong traditional curricula in a broad spectrum of engineering geosciences.

2) Dedicated teaching staff at all levels. Didactic training of junior staff is an important aspect.

3) Dedicated efforts to provide students with practical training in a situation when many traditional possibilities cease existing in Croatia due to a decline in the mining industry.

4) Development of new research directions to match the emerging new trends in geo-engineering.

5) Systematic efforts to increase international staff mobility through involvement in various international programmes and through establishing formal collaboration with foreign universities. Financial support to conference participation for the academic staff and PhD students is an important initiative.

6) Significant break-through since 2012 in the total number of publications and the number of publications in the top-level international journals. The reward system may be an important factor in this increase.

7) Administrative and technical support for grant applications, which should be maintained.

8) Exceptional quality mineral/rock collection which is located in a teaching room instead of being made “the face” of the Faculty.

We hope that our recommendations will be helpful.

On our side, we enjoyed the hospitality, help and openness of the Agency and the Faculty.