



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

**Date of preliminary site visit:
11th May 2021**

**Date of on-line re-accreditation:
12th – 14th May 2021**

June, 2021

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INTRODUCTION

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

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

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

Members of the Expert Panel:

- Prof. Dr. Jiří Barek, Charles University, Faculty of Science, Czech Republic
- Prof. Dr. Malte Braack, Christian-Albrecht University of Kiel, Federal Republic of Germany
- Prof. Dr. Donald Bruce Dingwell, Ludwig Maximilians University of Munich, Federal Republic of Germany (Panel chair)
- Prof. Dr. Marin Karuza, Department of Physics, University of Rijeka, Republic of Croatia
- Prof. Dr. Miranda Mladinić Pejatović, Department of Biotechnology, University of Rijeka, Republic of Croatia
- Tamara Rom, Faculty of Science, University of Split, Republic of Croatia, student
- Prof. Dr. Frank Witlox, Ghent University, Kingdom of Belgium

During the on-line re-accreditation, the Expert Panel held meetings with the following stakeholders:

- Management
- Committee for Quality Assurance
- Students
- Heads of Departments

- Assistant Heads of Departments
- Full-time teaching staff
- Teaching Assistants and postdoctoral researchers
- Leaders of research projects
- Heads of Ethics Committee, Disciplinary Committee, Commission for Irregularities, Career Centre, and Leader of the Office for International Cooperation and Projects
- External Representatives of the business sector and potential employers
- Alumni

The Croatian Expert Panel members took part in a site visit on 11th May 2021 during which they had a tour of the work facilities, laboratories, library, IT classrooms, student administration office and classrooms. They also attended sample lectures, where they held a brief Q&A session with students.

During the site visit, the rest of the Expert Panel examined the available additional documents and study programme descriptions (learning outcomes).

The Expert Panel drafted this Report on the re-accreditation of Faculty of Science University of Zagreb on the basis of Faculty of Science University of Zagreb self-evaluation report, other relevant documents, preliminary site visit and on-line meetings.

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 and recommendations for improvement and quality grade for each assessment area
- Detailed analysis of each standard and 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, preliminary site visit to the Faculty of Science University of Zagreb, online meetings and writing of the Report, the Expert Panel was supported by:

- mr. sc. Sandra Bezjak, coordinator, ASHE,

- Davor Jurić, assistant coordinator, ASHE,
- Lida Lamza, interpreter at the preliminary site visit and during the online meetings, ASHE, and translator of the report, 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 Science University of Zagreb

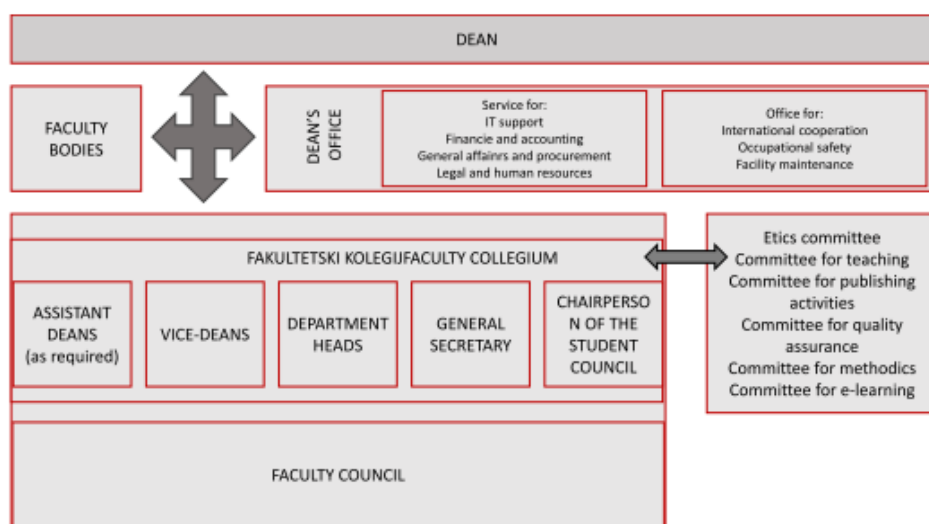
ADDRESS:

Horvatovac 102a

DEAN:

Prof. Dr. Mirko Planinić

ORGANISATIONAL STRUCTURE:



STUDY PROGRAMMES:

- Undergraduate university study programme Biology
- Undergraduate university study programme Molecular Biology
- Undergraduate university study programme Environmental Science
- Graduate university study programme Experimental Biology
- Graduate university study programme Ecology and Conservation
- Graduate university study programme Molecular Biology
- Graduate university study programme Environmental Science
- Integrated undergraduate and graduate university study programme Biology and Chemistry
- Postgraduate university study programme Biology

- Integrated undergraduate and graduate university study programme Physics: research specialisation
- Integrated undergraduate and graduate university study programme Physics Education
- Integrated undergraduate and graduate university study programme Physics and Computer Science Education
- Integrated undergraduate and graduate university study programme Physics and Technics Education
- Integrated undergraduate and graduate university study programme Physics and Chemistry Education
- Postgraduate university study programme Physics
- Graduate university study programme Physics-Geophysics; specialisations: Seismology and Solid Earth Physics, Meteorology and Physical Oceanography
- Postgraduate university study programme Geophysics

- Integrated undergraduate and graduate university study programme Geography and History Education
- Undergraduate university study programme Geography; research specialization
- Graduate university study programme Geography; research specialization
- Graduate university study programme Geography Education
- Postgraduate university study programme Doctoral study in Geography; Space, Region, Environment, Landscape

- Undergraduate university study programme Geology
- Graduate university study programme Geology
- Graduate university study programme Environmental Geology
- Postgraduate university study programme Geology
- Postgraduate university study programme Interdisciplinary doctoral study of Oceanology

- Undergraduate university study programme Chemistry
- Graduate university study programme Chemistry research specialisation
- Graduate university study programme Chemistry (single subject) Education
- Postgraduate university study programme Chemistry

- Undergraduate university study programme Mathematics
- Undergraduate university study programme Mathematics Education
- Graduate university study programme Theoretical mathematics
- Graduate university study programme Applied mathematics
- Graduate university study programme Mathematical statistics
- Graduate university study programme Financial and Business Mathematics
- Graduate university study programme Computer Science and Mathematics

- Graduate university study programme Mathematics Education
- Graduate university study programme Mathematics and Computer Science Education
- Integrated undergraduate and graduate university study programme Mathematics and Physics Education
- Postgraduate specialist study programme Actuary mathematics
- Postgraduate university study programme Mathematics

NUMBER OF STUDENTS:

- 4 449 full-time students

NUMBER OF TEACHERS:

- 289 full-time teachers appointed in scientific-teaching grades
- 3 full-time teachers appointed in scientific grades
- 9 full-time teachers appointed in teaching grades

SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION

Continuous scientific and teaching work in the sciences is evident following the restoration of the University of Zagreb in 1874, when the Parliament adopted the Act on the Organisation of the University. As part of the newly established Faculty of Philosophy, new departments and sections were established. Among others, the Natural Science and Mathematics Department was established in 1876.

In 1946, a Decree of the Government of the National Republic of Croatia, the Faculty of Science was separated from the Faculty of Philosophy and began its operations independently as the Faculty of Science. In 1948, the Faculty consisted of the Department of Biology, Department of Chemistry, Department of Geography, Department of Mathematics and Physics, which also included Geophysics Institute. During the early development of the Faculty, it also included separate institutes. The Department of Mathematics and Physics was divided to form the Department of Mathematics and Department of Physics, where the latter continued to include Geophysics Institute.

Stronger scientific and teaching development resulted in further organisational changes and since the 1980s, has included 7 departments: Biology, Chemistry, Geography, Geology, Geophysics, Mathematics and Physics. With the new Statute in 1995, the departments were awarded greater autonomy in their scientific and teaching work. More recent statutes, particularly the newest adopted in 2020, further emphasise autonomy in scientific activities and teaching.

BRIEF ANALYSIS OF THE INSTITUTIONAL ADVANTAGES AND DISADVANTAGES

ADVANTAGES OF THE INSTITUTION

1. Reputation as a leading centre of teaching and research in the country.
2. Considerable resources and infrastructure in a major urban environment.
3. Critical mass to enable the creation of interdisciplinary research centre.
4. Highly motivated staff and faculty members who strive to be the best in Europe.
5. A vast potential for external stakeholder involvement and alumni relations.

DISADVANTAGES OF THE INSTITUTION

1. Considerable financial burdens through state finances from the recent earthquake and pandemic.
2. A struggle to fully internationalise the recruitment of staff, faculty and studies for financial and language reasons.
3. A need for the enhanced coordination of quality control measures at faculty level.
4. A relative lack of measures which reward initiative in research and teaching.
5. A need for professionalisation of feedback and complaint channels to make them more effective.

LIST OF INSTITUTIONAL GOOD PRACTICES

EXAMPLES OF GOOD PRACTICE

1. Establishment of a Career Centre
2. Departmental awards
3. Establishment of Appeal officers
4. Opening for research intensive studies and publication pre-thesis
5. Efforts to adhere to European ECTS studies systems largely accomplished

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

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

Analysis

The Faculty of Science is the largest and most important HEI in the field of natural sciences in Croatia. As such, it has an established and efficient quality assurance system which is based on international, national, university and faculty regulatory framework. The recommendations from the previous accreditation were seriously taken into account and several changes based on them have been implemented. However, there is still space for the improvement of procedures and practices especially in the form of the spreading of already existing good practices from some departments to the others and their recognition and application at the Faculty level. The cooperation with industry, research institutes, state administration and presence in the community are noteworthy. Its social role is very clear and irreplaceable. In the future it will become even more important with establishment of lifelong learning programmes interesting for wider audience. However, in order to ensure further growth and development, personal and professional development of its employees should be continuously monitored and promoted.

Recommendations for improvement

- Establish a body responsible for implementation of recommendations from reaccreditation process.
- Increase the visibility of various bodies involved in the quality assurance process, promote their role and increase transparency.
- Promote good practices, for example teaching/scientific/technology transfer awards, present at departments and apply them across the Faculty and establish them at the Faculty level.

Quality grade

Satisfactory level of quality

II. Study programmes

Analysis

The courses and study programs at the Faculty of Science are in general of a high level. Some new study programs show a truly innovative character with international cooperation. The HEI must continue to defend its role and privilege of a leading

scientific institution in Croatia and react in a timely manner to new opportunities on the labor market and in science. Several new major research projects loaded by PMF have enabled new levels of research. The reputation and the visibility of the faculty inside Europe has become more prominent during the last five years. The improvement of available research equipment is very beneficial for students, staff, and for stakeholders from outside the HEI, leading to substantial increase of research projects, also with industry. The faculty delivers a large variety of study programs for primary and secondary school teachers, and they are in line with the Croatian Qualification Framework.

Recommendations for improvement

- Increase the transparency of student surveys and student's feedback so that the resulting measures and the reasons to maintain the status quo are communicated more clearly to the students. Assigning responsible persons may help to ensure this regular communication.
- Systematically and regularly inspect the curricula of all study programs in view of ECTS inconsistencies (as listed above) and unrealistic ECTS allocation. In particular, different ECTS points for the same lecture and same exam standard but different study programs should be examined carefully, 0 ECTS points courses should be eliminated.
- Find ways of make the financing of the Career Center sustainable and consider possibilities to increase the manpower in the Career Center.

Quality grade

Satisfactory level of quality

III. Teaching process and student support

Analysis

The HEI has shown initiative in providing excellent support to students, especially with the opening of Career Center. Criteria for admission or continuation of studies are publicly available on the website of the Faculty. There are courses that nourish student autonomy and responsibility. Vulnerable and under-represented groups are treated individually. Criteria and methods for evaluation and grading are aligned with the teaching methods used. Diplomas and Diploma Supplements are issued upon completion of studies and are according to relevant regulations. The employability of the Faculty graduates is checked at the Croatian Employment Service. There are events to inform their students where to find employment and what a day in a work-life looks like for

that profession. However, there is room for improvement in the form of an even more uniform and systematic approach at the Faculty level.

Recommendations for improvement

- Regulate the uniformity and number of midterms and exams in all courses and Departments at the Faculty level.
- Ensure proper education for teaching staff on implementation of active learning styles and support to students.
- Make clear who is the first person to contact in the case of outgoing mobility, perhaps starting with webinars that promote mobility and describe the procedure in detail.

Quality grade

Satisfactory level of quality

IV. Teaching and institutional capacities

Analysis

The HEI possesses an appropriate number of highly qualified teachers and researchers to provide for the delivery of study programs and achievement of the learning outcomes, as well as for the performance of the scientific activities. The workload of the teachers ensures the successful conducting of the study programs and in average appropriate distribution of teaching activities. The HEI procedures regarding the employment and promotion/advancement in career are in accordance with the national regulations. The Departments have the autonomy in employment such that some Departments operate with additional regulations, which fix higher criteria than the minimum criteria determined by national regulations, ensuring the scientific and teaching excellence, and bodies covering staffing policy. The number of employees recruited from outside the Faculty (e.g. international researchers, returnees) is very low. The advancement of the competences of teachers, as well as their mobility (e.g. conference attendance and mobility to perform research activities) in general is closely related to external projects/financing. The Career Center has been recently established and seems to be appreciated by the students and teachers alike.

The Faculty operates impressive space, infrastructure, libraries as well as state-of-the-art capital equipment for conducting competitive scientific research and teaching. However, due to the consequences of the earthquake and the delay in the building of the planned new structures, the infrastructures of the individual Departments are quite different.

The Departments have a high level of financial autonomy and they manage the resources in an appropriate way, providing also the support for the maintenance of the expensive equipment (e.g. Departments of Chemistry and Physics). There is a positive trend of increasing the Faculty's own income, independent of the state budget, mostly through the exploitation of national and international funds intended for research, teaching, infrastructure, quality assurance or similar.

Recommendations for improvement

- Install a body at the Faculty level that will guarantee equivalent employment policies, procedures and criteria in all departments.
- Increase the number of the employees that are recruited outside the Faculty (e.g. returnees, international researchers) to overcome the national restrictions in employment possibilities and to increase the internationality
- Establish a Faculty board for infrastructure, to design and implement the strategic management of the existing infrastructure resources and the new investments (new buildings).

Quality grade

Satisfactory level of quality

V. Scientific/artistic activity

Analysis

The HEI aims to create an environment that will give teachers and research staff all opportunities to excel in high quality and quantity of scientific research. Although differences exist across disciplines the HEI strives at continuously raising the bar to higher levels. It should do so across all departments, taking leading examples from one department as standard for other departments. The research has high societal value, and is recognized by different stakeholders at different geographical scales (local, regional, national, international). Long term research perspectives are targeted at being both sustainable and developmental, and there is solid evidence that teaching and research are connected. The HEI can be proud of its achievements, but should be wary not to slow down the ongoing process of increasing quality. To this end the panel makes a series of suggestions for improvement.

Recommendations for improvement

- Continue to cherish the strong and good relationship between the HEI and economic and public sectors, and do this by staying in closer contact with one another by means of different means (virtual, physical). Use this embeddedness to be informed about new research strands and societal needs.
- Develop across all departments awards systems. These systems do not necessarily have to be financial; recognition (by the department, faculty, university) can be a strong motivator. Take these recognitions into account when promoting people.
- Give financial support to those staff members who aim at submitting very competitive research grants (Horizon Europe, ERC).
- Continue to focus on integration of teaching and research, and strive for more interdisciplinary research approaches.

Quality grade

Satisfactory 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

The quality assurance policy is a relatively new development. The principles were laid down two years ago with the establishment of Ordinance on quality assurance at the Faculty of Science. A body of 11 members, which includes Department representatives, external stakeholder, student and representative of staff, has been established. The PMF strategy for the period 2015 – 2020 defines the basic strategic goals which are in accordance with its mission and vision. The report on the realization of the strategy is not yet available although annual reports of the Faculty are presented. The strategy for the period 2020 – 2025 is still missing. It must be noted that there is a Research strategy for the period 2018 – 2023, but it obviously covers only a part of the comprehensive strategy. The students and external stakeholders are formally involved in decision making at all levels (Department council, Faculty council and other committees) but their influence on preparation of strategic documents is not evident. From academic year 2016/2017 onward reports and action plans are available on the Faculty website where all activities according to ESG standards are included. Although there is a certain activity at the Faculty level it is not clear what is effectively done at the Departments. Furthermore, an efficient feedback mechanism based on analysis of collected data and information from various stakeholders is not fully implemented although a formal procedure of study programmes quality control is carried out and based on the opinion of the PMF Quality Management Committee. The change and amendment procedure of the study programmes is described on the web page.

In the accreditation report the Department of Mathematics provided examples of surveys conducted at the department level. Generally, statistics are publicly available only for the Faculty as a whole. Exceptions are the surveys related to the COVID-19 pandemic, but they are only loosely related to the quality assurance. Comprehensive surveys are done every three years by the University of Zagreb. The regulatory framework is there but there is too little evidence of systematic activity.

Scientific and professional development of all employees is mostly achieved through visits to eminent foreign universities or scientific institutes. This activity mostly depends on personal initiative. Careers of younger associates are followed, while the same is not true for more senior staff. The system for achievement recognition is non-existent at the Faculty level, although some Departments have awards for teaching and/or scientific achievements.

Recommendations for improvement

- Prepare a new strategy report; also, a report on the previous period should be made.
- Introduce an efficient way on providing feedback to the study programmes.
- Survey results for every department should be made public.
- Install an online (instead of only 'on paper') feedback evaluation from students; this will also lead to potentially higher response rates.
- Avoid excessive dependency on external teachers (they may be less involved with the HEI).
- Standardize the award system across the Faculty.
- The established quality assurance policy of the faculty should emanate more clearly to the department level. The department leaders should be more supported by obtaining clearer indications for follow-up actions.

Quality grade

Satisfactory level of quality

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

Analysis

More than 20 recommendations were issued during the last re-accreditation. In the current Self-evaluation dated March 2021 their implementation was extensively discussed and documented. The adoption of individual recommendations will be individually discussed.

1a *“Strategic goals”* - Fully implemented.

1b *“Teaching quality”* - Partially implemented. Not institutionally implemented at Departments.

1c *“Geoscience Departments”* - Partially implemented. The scientists at Geoscience Departments have a strong expertise in spatial planning. Their participation in planning issues is not implemented in national legislation which is clearly out of Faculty’s power.

1d *“Partner institutions”* Fully implemented.

2a *"Courses"* - Not yet implemented. The changes to the integrated study programmes (5+0) and introduction of separate undergraduate and graduate study programmes (3+2) have not been implemented although the courses have been rationalised where possible. It is not discernible how student's proposals were considered and implemented in the study programme changes which have been implemented since 2016/2017.

2b *"Mobility"* - Fully implemented.

2c *"Examinations"* - Partially implemented. The existent ordinances on examinations are publicly available but are not consistently implemented in all departments.

3a *"PhD studies"* - Partially implemented. The deadline for the completion of doctoral studies is not reduced. However, this is not within Faculty's authority.

3b *"Presentations of research results"* - Fully implemented.

3c *"Alumni"* - Partially implemented. Huge steps forward are made but alumni database at the Faculty level is missing.

3d *"Web site"* - Fully implemented.

4a *"Recruitment"* - Fully implemented.

4b *"Teaching load"* - Not yet implemented. Teaching load of some professors and teaching assistants employed on the projects is heavy.

4c *"Career"* - Partially implemented. Regular self-assessment of the employees is not introduced.

5a *"External funding"* - Fully implemented.

6a *"EU funds"* - Fully implemented.

6b *"Research office"* - Partially implemented. Research administrative support and information office including presence in Brussels is not yet set-up.

6c *"Language"* - Partially implemented. Due to the Croatian legislation and obligatory use of Croatian language the employment of international staff is not supported/discouraged.

6d *"European Research Area"* - Fully implemented.

7a. *"BGG building"* - Not yet implemented. Construction of new building is not within Faculty's power.

7b *"Maintenance"* - Partially implemented. Funds for maintenance are not provided by faculty. Some are provided by departments, but most come from existing scientific projects.

Recommendations for improvement

- Form a body responsible for implementation of recommendations.

Quality grade

Satisfactory level of quality

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

Analysis

The regulatory framework is almost complete and it is based on relevant University of Zagreb, national and international acts. The bodies responsible for their enforcement are established. However, Ordinance on disciplinary responsibility of PMF staff does not exist. Currently potential disciplinary offences of the employees are sanctioned by the Ordinance on work but it is limited to employees. It is not clear how an eventual disciplinary offence of the employee which includes violation of students' rights is processed. The same holds for any violation of student's rights. Maybe it's not related but the call for anonymous communication for the current reaccreditation process was not found on the Faculty's web page.

The Decision on nomination of Ethics Committee is in contradiction with the University's Code on Ethics since it has more members than it is allowed by the Code. Students can report discrimination or harassment through Career Centre and Commissioner for irregularities. It is not clear whether they could report cases also to the Ethics Committee. The relevant bodies have had very few cases in the past years which might lead to a conclusion of underreporting. There were also no cases known to the ethics committee of ethical issues concerning the experiments on animals or humans which is uncommon since the Department of Biology is also a part of the Faculty. One such case was treated by the Ministry of Agriculture.

Recommendations for improvement

- Make publicly available the procedure for reporting violation of rights.
- Redouble efforts to adhere to the legal Framework concerning such complaints.
- The HEI should disseminate the availability and jurisdiction of the Ethics Committee and Commissioner for Irregularities. In particular, students should be informed about the possibility to get a support. Moreover, it should be established that related problems reported to the dean or rector should be transferred to the responsible bodies of Ethics and/or Irregularities, so that their involvement is ensured.

Quality grade

Minimum level of quality

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

Analysis

The Faculty of Science is the largest and most important HEI in the field of natural sciences in Croatia. It is engaged in vast range of activities that are well presented in the media and its websites. The departmental websites are available in both Croatian and English language and the contained information is up to date and exhaustive. One of the key social roles of the Faculty is related to the improvement of the educational system at all levels. Employees and the Faculty provide support to the national educational system through participation in various committees, working groups and production and improvement of teaching materials. However, the least visible activities are those related to the improvement of the Faculty itself. The results of the surveys and their implementation in the process of the quality improvement do not provide detailed information and they are not visible.

Recommendations for improvement

- Consider starting internal communication also in English.
- Proper attention should be paid to mastering scientific English.
- Survey results should be published at Department level.

Quality grade

Satisfactory level of quality

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

Analysis

The Faculty of Science is the biggest and most important HEI in the field of natural sciences in Croatia. It provides high quality and effective university education in the field. The cooperation with industry, research institutes and state administration is noteworthy. Furthermore, the Faculty is engaged and present in the community, locally and nationwide, with prominent example being the Botanical Garden and Seismological service. It promotes science through various popularization activities such as Faculty days, Meet the Mathematician, as well as Night and Day at Faculty.

Recommendations for improvement

- Use feedback from alumni and external stakeholders to strengthen the attractiveness of studying in the faculty to both students and their future employers.
- Establish an award for technology transfer.
- Support technology transfer through institutional funding.

Quality grade

High 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 concept of lifelong learning has been accepted by the Faculty as a part of its mission. Most of the programmes are aimed at educating, advising and guiding education stakeholders. Most of the activities are carried out through PriMaTeh Centre established in 2014. Other lifelong learning activities are provided through lectures by renowned experts, workshops and department colloquies. The course LabAnim organised by Department of Biology is an example to follow where persons working with experimental animals and animals used in the production of biological preparations are trained. Such activities which are not limited to staff or educational stakeholders should be encouraged and promoted.

Recommendations for improvement

- Further develop organisational lifelong learning programmes for a broader audience and involving external stakeholders.
- Extend lifelong learning programs to all students and alumni, and not only dedicated to high school teachers.
- Implement satisfaction surveys in the lifelong learning programmes.
- Develop new lines of lifelong learning to increase participation of external stakeholders.

Quality grade

Minimum 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 course and study programs of PMF are at a high level, large parts are modern and innovative. This is also reflected by a high level of scientific outcome and innovative research. The new English study program in Biomedical Mathematics and the diploma study program on Bioindustry Techniques, with international cooperation, are examples of innovative and novel directions in learning. It shows that the HEI can react in a timely manner to new opportunities on the labor market and in science. International cooperation is well established at the Faculty of Science of Zagreb and directly contributes to several study programs. The HEI must defend its position as a leading scientific institution in Croatia. Several new major research projects led by PMF enable a new level of research. The reputation and the visibility of the faculty inside Europe has also become more prominent.

The improvement of available research equipment is not only beneficial for the student and staff, but also for stakeholders from outside the HEI, leading to substantial increase of research projects with industry. The establishment of the Career Center can be considered as a further main improvement in the last years. This center is highly appreciated by the students, the university staff and the stakeholders from industry, academia and economy.

The faculty delivers a large variety of study programs for primary and secondary school teachers, and they are in line with the Croatian Qualification Framework. The study programs for further regulated professions, e.g., in health care and air traffic control, benefit from the strong involvement of the faculty in related professional organizations.

Recommendations for improvement

- Maintain the path of high quality in the mission of strategic goals.

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

The HEI has established a number of working groups to validate and improve the study programs. The faculty participates in several projects aiming to develop the qualification and profession standards, for instance EcoRaMa and FizKO. As an outcome, several profession standards in the fields of Mathematics, Computer Science and Physics were established. The PMF can be considered as the main driver for defining those standards. Moreover, many study programs are aligned with educational guidelines of relevant international organizations, e.g., IEEE Computer Science, Ass. Computing Machinery, Europ. Phys. Soc., Europ. Chemical Society EuChemS (formerly European Association for Chemical and Molecular Sciences). The study programs are also aligned with the Croatian Qualification Framework. Moreover, the employment rates of the graduates are very high for many of the study programs. However, there are the following exceptions with lower employment rates: Molecular Biology, Ecology and Nature Preservation, Environmental Sciences, Experimental Biology, Geography (Science), Applied Mathematics (see Tables 3.7 of Analytic Supplement).

Recommendations for improvement

- The reasons for the lower employment rates of graduates in the upper mentioned study programs should be examined and stakeholders of related professions should be consulted. This should lead to further improvement and adaptation of the content of those study programs resulting in better employment chances.
- It is recommended to reconsider the name of the study program Experimental Biology at the Biology Department, because it could be misinterpreted that the other programs (e.g. Molecular Biology, Ecology and Nature Preservation, Environmental Sciences) are not experimentally oriented.

Quality grade

High level of quality

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

Analysis

The teaching capacities and infrastructure of the faculty are adequate to provide the intended learning outcomes. The learning outcomes are ensured by a large variety of evidences, as oral exams, written exams, seminars, laboratory and practical courses, etc.

Field excursions and laboratory experiments are parts of the study programs whenever reasonable.

All course responsible persons analyze the learning outcomes of the courses on an annual basis. All study programs are also monitored annually. The resulting information can be used and are used for further improvements of courses and study programs. Graduates of the HEI have a very high level of academic knowledge. This is demonstrated by the high standard of the final assignments, the recognition of the scientific output, and the positive engagement of stakeholders on the labor market and in academia. The established Geography employment round table is appreciated and may help to enhance the employment rates of graduates in Geography.

Recommendations for improvement

- The employment round table of Geography should be pursued and its results should be further elaborated and implemented in the study program to increase the employment rates in Geography (Science).

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

The mechanisms to use feedback from students and alumni improved a lot in the last six years. All courses and teachers were evaluated in 2016/17 and in 2019/20. This is also pretty much appreciated from those groups. Furthermore, the recommendation of the 2015 report are recognized by the HEI and led to significant changes in three study programs. However, the student interviews showed that a considerable part of the students are still not satisfied with their possibilities to contribute to improve teaching content or methods. They criticize the lack of feedback from student evaluations and missing control over underperforming teachers.

Furthermore, the expert panel like to stress once more the disadvantage of the existing integrated study programs (5+0) with respect to mobility and change of study subject. Likewise, some students complain about the lack of mobility in such programs.

Recommendations for improvement

- The faculty should increase the transparency of student surveys and student feedback so that the resulting measures and the reasons to maintain the status

quo are communicated more clearly to the students. Assigning responsible persons may help to ensure this regular communication.

- The HEI should put more emphasis in replacing the 5+0 programs by 3+2 counterparts wherever possible. The HEI should also use their influence to ministry and politics to release the legal constraints which might be an obstruction.
- More support should be given to those students feeling that they are not ready to study scientific literature in English.

Quality grade

Minimum level of quality

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

Analysis

Most ECTS allocations reflect the standard work load quite well. The HEI partially adapted the ECTS allocations in the past on basis of feedback and different types of analyses. However, several study programs still include unrealistic ECTS allotments due for different reasons, e.g., the restrictions of maximum and minimum work load per semester. The panel is aware that realistic and fair ECTS allocations may become very challenging and subjective. However, the students confirm that certain lectures have different credit points depending on the particular study program. This is justified only in exceptional cases, for instance, due to unequal requirements in the exams or diverging previous knowledge in different study programs, but not as a consequence of available total work load per semester. Furthermore, allocations of 0 ECTS points for core modules (see Quantum Physics and Statistical Physics) should be eliminated. Therefore, we appeal the HEI to eliminate such inconsistencies.

Recommendations for improvement

- The curricula of all study programs should be systematically and regularly inspected in view of ECTS inconsistencies (as listed above) and unrealistic ECTS allocation. In particular, different ECTS points for the same lecture and same exam standard but different study programs should be examined carefully. Cases of 0 ECTS points should be eliminated.

Quality grade

Satisfactory level of quality

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

Analysis

Students in advanced studies participate in many research projects and gain a very valuable and inspiring insight into science. Practical exercises are usually integral parts of many study programs offered by the HEI. The ProSPer project and the new established Career Center provide further possibilities for the students to acquire work experience in institutions outside the HEI. The existence of the new Career Center got around quickly and is fully recognized by institutions and companies outside the HEI so that the number of possible tasks and projects of this center became rapidly overwhelmed. More manpower in this center would be helpful to amplify its range of activities.

However, in some study programs, the ability to work in groups or teams on projects is rather limited. In view of the student's pertinency for the labor market, the lack of experience on projects can be a major disadvantage. The interview with stakeholders from industry exhibited that the labor market is aware of such deficiencies in the study programs of Physics and Mathematics.

Recommendations for improvement

- The HEI should find ways of make the financing of the Career Center sustainable and consider possibilities to increase the manpower in the Career Center.
- Study programs (in particular Physics and Mathematics) should reinforce the possibilities for the students to work in projects and with more practical experience.

Quality grade

Minimum 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:

Criteria for admission or continuation of studies are publicly available on the website of the Faculty as stated in the Self-evaluation document. Overall the criteria are consistently applied according to the students. However, regular update to the criteria only covers two departments and is not really regular (one is from 2016 and other from 2018). Recognition of prior studies hasn't been noticed as an issue when we talked to students and as shown in evidences there are several cases with recognition of prior studies. However, it's difficult to change programmes that are even conducted under the same Department due to the 5+0 style of programmes.

Recommendations for improvement:

- There should be some changes made to enhance the ability of transfer from one study programme to another within the Faculty.

Quality grade

High level of quality

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

Analysis:

Overall as confirmed by evidences and students there are not many issues regarding definition of monitoring of student progress. However, there were a few examples provided when professor changed the defined procedures in the middle of the semester. But, as mentioned those are in the minority and go hand-in-hand with the problem of student complaints. This means that there is no supervision of each and every teacher.

There is, also, no standardised form for the collection and archiving of analyses of student progress by subjects (only by study programmes), as stated in the Self-evaluation. To improve the continuity and completion of study, best students are taken as student demonstrators for exercises, practical work and seminars, furthermore, admission criteria are changed to ensure a better selection of candidates who will enrol the first year of studies. However, there is no feedback collected systematically to make sure if those two criteria are actually making any changes from the students'

perspective – for example, do demonstrations actually help them complete their studies.

Recommendations for improvement:

- There should be a systematic approach employed in order to ensure lower drop-out rate and higher pass rate. For example, the faculty can contribute to contacting students that drop out, and then analyse the reasons for this behavior.

Quality grade

Minimum level of quality

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

Analysis:

For courses that require field work and practical work there are smaller groups and more active learning style implemented. However, such courses vary from study programme to study programme and there are no evidences of active learning in courses that are more theoretical in nature. Publishing scientific papers and individual work with professor is possible but are often initiated by the student.

There are no evidences on continuous upgrade of teaching methods with new approaches and technologies. Despite the statement in the Self-evaluation, there is no evaluation of teaching staff or teaching methods at the end of every semester on the department level, nor is there a discussion with students. There are sometimes forums with students within a few departments but it is not obligatory. The only survey that is given to students is made by the University or students themselves, which means there is no systematic survey on the faculty level. The practice of reading each other's materials within the teaching staff is not common.

When students have complaints in the University surveys they don't see any progress made regarding issues they mentioned. Teaching methods can be adapted to the students with some kind of disability, but there are not many underrepresented groups so it's hard to see if everybody is getting the support they need.

New technologies and equipment are available to staff and students. Not all teachers are contributing to the motivation of students and their engagement but students are overall satisfied. There are courses that nourish student autonomy and responsibility.

Recommendations for improvement:

- Ensure proper education for teaching staff on implementation of active learning styles and support to students.

- Teachers should be motivated by the creation of an award system for the best teachers by the Faculty to recognize and improve their teaching methods and style.
- Give the opportunity to all students to write research papers, either by the creation of a Research Project course or within existing courses.
- There should be a feedback system (student surveys) implemented on the institutional level and also forwarded to the quality assurance team not just the department heads and their assistants in order to enhance transparency of results. It should be made clear who is authorized to act on student complaints, if any are received.

Quality grade

Minimum level of quality

3.4. The higher education institution ensures adequate student support.

Analysis:

Guidance on studying and career opportunities has been provided by the Career Center which was established in 2020, which is a bit late if we consider that from the last reaccreditation procedure there was no system for this. Students don't have mentors from the Faculty but have created a "buddy" system themselves where older students help freshmen.

There is no evidence for student satisfaction with the support provided for the last five years (only from students that graduated from undergraduate studies in 2016/2017). It is however obvious from talks with students that this is nonetheless improving with Career Center. Legal counselling is missing, though. There were cases when student rights were violated and the Faculty didn't provide any help or problem solving. Help with mobility exists but it is not well promoted amongst students who is the right person to talk to in case of outgoing mobility.

There are not many under-represented groups so it is difficult to say if they get sufficient support from their point of view, but all Faculty members seem open to providing help to such students and there is a coordinator for students with disabilities. Restrictive employment measures make it difficult to have an appropriate number of employees to work with students.

Recommendations for improvement:

- It should be made clear who is the first person to contact in case of outgoing mobility, maybe starting with webinars that promote mobility and describe the procedure in detail.

- Implement legal counselling with the Career Center if possible.
- All under-represented groups should be informed on whom they can contact for help, not just students with disabilities.
- Restrictive employment measures should be lifted if there is not enough support for students.

Quality grade

Satisfactory level of quality

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

Analysis:

Vulnerable and under-represented groups are treated individually. It is not clear who is the first person to contact if you are a student of this group. Students can contact the University which then contacts the Faculty and responsible persons. Students can also seek help from Career Center. However, there is no one whose job is just monitoring students that come from these groups. On the other hand, there haven't been many students from under-represented groups so there was no need to employ somebody to be responsible for that role. There is a state scholarship for students with disabilities, but Faculty doesn't have additional scholarships. However, the fees for enrolment can be reduced for students with disabilities. Not all buildings are accessible for students with disabilities. If students can't pay for the field trips they can send a request to be excused from the payment to the Department. Overall, there is no system for all vulnerable and under-represented groups only for students with disabilities and a way to be excused from some payments for those of lower socio-economic status.

Recommendations for improvement:

- A person who is responsible for students with disabilities should monitor other groups as well so that there is a clear path for students coming from vulnerable and under-represented groups to seek help.
- There should also be a system in check for the under-represented groups as if they are always there and not to solve such requests individually.
- Invest in adaptation of buildings to increase accessibility.

Quality grade

Minimum level of quality

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

Analysis:

Students are permitted to gain international experience but are not motivated to do so due to the ways their study programmes are carried out. The 5+0 model is decreasing their chances of mobility. There are ECTS coordinators and a coordinator for international relations but most questions are being solved between the student and a professor who they ask for help or departmental coordinators of ECTS points or international relations. Students are overall informed about opportunities for mobility but it could be better promoted and explained to them. Overall it is the atmosphere that ECTS points won't be recognized so students avoid going to mobility until the last year of studies when they have more elective courses.

There is no collection of information on student satisfaction with the quality of the Faculty's support except for informal talks with students. Regarding foreign language teaching, there is literature in English, however, not all programmes have scientific English. There is no system to ensure that the competencies required for employment are gained in an international environment, it all depends on personal preferences of a student.

Recommendations for improvement:

- Create and implement feedback surveys for the finished mobilities.
- Promotion and detailed explanation of mobility possibilities and procedures should be conducted perhaps by webinars.
- Scientific English should be made obligatory to help students study from foreign literature and possibly the number of exchange students should be increased. There should be obligatory international dimensions of the programmes, at least scientific ones.

Quality grade

Minimum level of quality

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

Analysis:

The website provides information in English and there are contacts for more information. However, study programmes are held in Croatian and incoming students mostly have consultative classes since there is not enough teaching staff to teach the

same class in both Croatian and English. Students are supported by the Student Office and ECTS coordinator and coordinators of international relations but also their mentors if they are in Croatia for thesis writing. Feedback on satisfaction and needs of foreign students is not collected formally. There are opportunities to take Croatian language at the University level.

Recommendations for improvement:

- Implement collection of feedback and work on motivation of teaching staff to teach in English, hire more foreign professors.

Quality grade

Minimum level of quality

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

Analysis:

Criteria and methods for evaluation are mostly clear and published before the beginning of a course. There are sometimes exceptions and students don't have a legal body to complain to. Criteria and methods for evaluation and grading are mostly aligned with the teaching methods used. Younger teaching staff (PhD students that are teaching) is not provided with support to develop skills related to the testing and assessment methods, they are basically left on their own to work on that.

There is no insurance in objectivity and reliability of grading provided by the Faculty by some quality assurance system. There is no standardised evaluation of grading. Evaluation procedures are modified for the students with disabilities and this is done at the university level. Students only receive their grades but no tips on how to improve, unless they explicitly ask their teachers to provide them with those tips.

Recommendations for improvement:

- Criteria in certain courses held at different Departments should be uniform and improved at the Faculty level.
- Number of midterms and exams in all courses and Departments should be uniform and regulated at the Faculty level.
- Students should have the opportunity to move the date of the exams or midterms in case there are two or more courses overlapping.
- Bring in third persons to test and check objectivity and reliability of grades.
- Ensure that students have a person they can confide in and report any issues.

- There should be standardised evaluation of grading.
- After the exam results, teachers should provide individual insight into grades and help students improve, if necessary, for the next exam.

Quality grade

Satisfactory level of quality

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

Analysis:

Diploma and Diploma Supplements are issued upon completion of studies and are according to relevant regulations. Printing of the Diploma and Diploma Supplement is charged. Re-printing them is also charged with a fee.

Recommendations for improvement:

- Issue the Diploma and Diploma Supplement in Croatian and English free of charge.

Quality grade

Satisfactory level of quality

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

Analysis:

The employability of the Faculty's graduates is checked at the Croatian Employment Service. Since this is Faculty of Science, it teaches deficit professions that are needed in Croatia. This is checked by the Croatian Employment Service and is seen from many scholarships given to their students. Thus, it can be said that the admission quotas are aligned with social and labour market needs and available resources. It is a bit harder for research programmes graduates to find jobs in Croatia but they mainly go abroad. There are a few events to inform their students where to find employment and what a day in a work-life looks like for that profession. This is not unified at the Faculty level but there is Career Center at which students can ask more information. Career Center started in 2020 so it's still in a fresh start but it's going in a good direction. There is an issue regarding this, because it's funded by the European Union funds and the future is not clear on how they will be financed once the project ends.

There is no Alumni Club at the Faculty level nor is it oriented towards all alumni (current alumni clubs are only for those people that graduated from the teaching

programmes). Some alumni have more impact on changes going on at the Faculty, but most of them have completely lost connection except with a few people they became friends with. Alumni would like to be more involved with the Faculty.

Recommendations for improvement:

- Foreign institutions should be asked about the performance of the Faculty's graduates to check employability, especially for the research study programmes.
- All departments should implement good practice of events for their students where they have the opportunity to inform their students of employment positions and what a day in a work life looks like for that specific profession (something like a Career Day but for current students).
- Ensure the continuation of Career Center.
- Start an Alumni Club for all former graduates and all departments at the Faculty level.
- Organize collection of feedback from the alumni at the Faculty level.

Quality grade

Satisfactory level of quality

IV. Teaching and institutional capacities

4.1. The higher education institution ensures adequate teaching capacities.

Analysis

The number and qualification of teachers are acceptable for the delivery of study programs and achievement of the learning outcomes envisaged by the programmes, as well as for the performance of the scientific activities.

In the 2019/20 academic year, 123 full professors, 70 associate professors, 96 assistant professors, two tenured scientific advisors, 40 postdoctoral researchers, 137 researchers (assistants), 10 project staff, 47 expert associates, 9 teachers were involved in the delivery of the 43 study programmes. Teachers engaged in delivering courses are experts in appropriate domains and fields of science: mostly in Biology, Chemistry, Mathematics, Geology, Physics, Geophysics, Geography, but also in Biotechnology, Basic Medical Sciences, Interdisciplinary Natural Sciences, Agronomy, Computer Science and Kinesiology. The external teachers and associates (213 of them) are hired for specific teaching ranks, when internal staff is missing. However, the permanent full-time teachers employed by the Faculty represent over 50% of all the teachers in all study programs, except in Chemistry Department. This exception is acceptable since it is due to the high amount of the practical work which is covered mostly by the assistants or similar staff, employed through the non-permanent contracts. The ratio of students and full-time teachers (full, associate and assistant professors) is 1:14.2, which is an indicator for a good quality of study.

The workload of the teachers ensures the successful conducting of the study programs and in average appropriate distribution of teaching and scientific activities, although there are evident differences, ranking from 0 to 690 norm hours per year per teacher. Concretely, the teaching load of the full professors with tenure ranks from 90 to 656,5 norm hours per year per teacher, with average of 347,66 norm hours. The teaching load of the full professors ranks from 157,5 to 673,5 normal hours per year per teacher, with average of 336,7 norm hours. The teaching load for the associate professors ranks from 0 to 667 normal hours per teacher per year, with the average of 324,52 norm hours. The teaching load for the assistant professors ranks from 0 to 637,2 norm hours per teacher per year, with the average of 365,87 norm hours. For the postdoctoral researchers the teaching load ranks from 30 to 323,4 norm hours per teacher per year, with the average 155,14 norm hours. For the assistants/PhD students the teaching load ranks from 15 to 530 norm hours per teacher per year, with the average 113,43 norm hours.

There is no evaluation/document that shows the relation of the teaching and scientific load (e.g. if the leaders of the competitive research projects have less teaching load – as it should be regarding the national regulations - Collective contract).

Recommendations for improvement

- The teaching commitments of the teaching staff should be in equilibrium with the intensity of their scientific activity.
- The excessive teaching load for the doctoral and postdoctoral students should be avoided.

Quality grade

High 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

There is general satisfaction from both sides (employers and faculty management) on the situation and politics regarding the employment and promotion/advancement in career. The complaints/issues regarding the employment and promotion have not been initiated through the Ethical committee, irregularity commissioner or similar in the last years. Even though 77 teachers have been recruited over the past five years (and 33 have been retired), there is a limited possibility of new recruitment and promotion due to the national constrictions. The problem has been partially overcome by employment of the doctoral researchers and associates through competitive research projects (national and international).

The Departments have the autonomy in the employment politics. The Faculty management stress the possibility of the „coefficients market“ in the cases when there is a specific need, but it is not clear how this „market“ actually functions. The Committee for the employment or something similar does not exist at the Faculty level. The additional criteria for promotion, as well as the procedure and the composition of the committees for the employment/promotions are different at the different Departments. It is very positive that some Departments have the additional regulations and bodies covering staffing policy: for example, the Department of Mathematics has set up an Advisory Board on advancement and recruitment, while the Department of Chemistry and the Department of Geology have adopted additional rules on further requirements for appointment to scientific and teaching positions, which stipulate additional requirements for appointment to each rank and work post. Nevertheless, in some Departments the committees for the employment may be inadequate as they are composed solely of the head of the department and 4 full professors, without the participation of the outside members or younger faculty members.

The number of the employees that are recruited outside the Faculty (e.g. made the PhD elsewhere, returnees) is very low.

Recommendations for improvement

- A body that will design and equalize the employment policy at the Faculty level and assure the „coefficient market“ should be constituted.
- To overcome the national restrictions in employment possibilities and to increase the internationality, the number of the employees that are recruited outside the Faculty (e.g. returnees, international researchers) should be increased through the „returnee positions“.
- The additional criteria for the promotion of the teachers should be determined at the Faculty level. Also, the rules determining a composition of the committees for employment/promotion should be equalized at the level of the Faculty, taking in consideration the necessity of involving the committee members from the other Departments, as well as younger teachers/researchers.

Quality grade

Minimum level of quality

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

Analysis

The advancement of the competences of teachers is predominantly achieved at the level of the Departments, mostly through workshops organised within different projects (e.g. financed by EU) Also, the mobility of the staff (e.g. conference attendance and mobility to perform research activities) in general is closely related to outdoor projects/financing. The Career Center has been recently established that seems to be appreciated by the students and teachers. There is no general Faculty policy in career development planning, nor awarding policy (for e.g. the Faculty award for the best teacher does not exist).

Recommendations for improvement

- It is recommended to establish the rewards for the best teachers at the Faculty level.
- It is recommended to establish the in-door resources for the conference attendment and mobility, especially for the young faculties who are still not competitive for obtaining their own grants.
- It is recommended to make the Faculty policy for the career development for all the employees.

- It is recommended to strengthen the Career Center and to assure its permanent persistence.

Quality grade

Minimum 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

The Faculty is comprised of seven Departments (Mathematics, Physics, Geology, Chemistry, Biology, Geophysics and Geography), with the Botanical Garden (as an organisational unit of the Department of Biology), the Seismological Service (as an organisational unit of the Department of Geophysics), the Centre for Climate Research, and the Career Centre, which is reflected in the scattered locations of the attendant constituent units. The bulk of the primary scientific/research, teaching and specialist activity is conducted in eight buildings in Zagreb (at Bijenička cesta 30, Bijenička cesta 32, Horvatovac 95, Horvatovac 102a, Rooseveltov trg 6, Marulićev trg 9a, Marulićev trg 19 and Marulićev trg 20) and at the open spaces and greenhouses of the Botanical Garden. The Faculty also comprises the Seismological Service and its seismological stations all over Croatia, the mareographic station in Bakar and the geomagnetic observatory in Lonjsko polje.

The past year has been marked by the strong earthquake that hit Zagreb on 22 March 2020, in which all Faculty buildings were affected, and three were proclaimed temporarily uninhabitable (buildings of the Departments of Biology and Geography, and the faculty building at Zvonimirova 8). Significant financial investments will be required to repair the damages, and this unfortunately will be a limiting factor in the forthcoming period and enormous challenge for the Faculty.

Thus, the space and infrastructure at this moment is quite different for the different Departments, some of which have the impressive resources (buildings, study-holes, laboratories, instruments; e.g. Chemistry, Physics, Mathematics) while others are in very difficult position, where the staff faces severe lack of office and laboratory space, due to the consequences of the earthquake and the delay in the building of the new structures.

The Faculty owns an impressive capital equipment, that includes the impressive state-of-the-art devices and equipment for conducting competitive scientific research (Table 4.9. Capital equipment in the Analytic_supplement(119)_PMFZ).

Recommendations for improvement

- The space, equipment and the infrastructure resources should be managed at the Faculty level, providing that all the Departments have the equal resources and possibilities to work. There is an urgent need for a new building, preferably on the northern campus. The new building for the Biology and Geology Departments should remain a priority and until it is constructed, there should be the space from other Departments temporarily conceded to the Department of Biology and Geology.

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 and library equipment at the different Departments are impressive resources. The libraries of the Faculty of Science include seven libraries that function within Departments: Central Biological Library, Central Library for Physics, Central Geophysics Library, Central Geographic Library, Central Library of Geology, Central Chemical Library and Central Mathematical Library. Moreover, the Department of Biology has additional three field-specific libraries: Library of the Division of Zoology, Library of the Division of Molecular Biology and Library of the Division of Animal Physiology.

The library holdings currently number 123,530 books, of which 6,192 are mandatory literature textbooks. The holdings also include 4,052 foreign and 490 domestic print journals. The libraries take care of the digital repository of the Faculty of Science, "Dabar" which currently contains 5,737 final and graduate theses and doctoral dissertations, as well as 1,469 scientific papers published by the Faculty staff. The high amount of the material in the repository (76.3 %) is open access documents. The students and scientific-teaching staff have the access to 36 bibliographic databases including Current Contents, Web of Science Core Collection, Journal Citation Reports, Scopus, etc. and 45,754 full text electronic journals.

Recommendations for improvement

- Continue updating the library and developing e-book capabilities.

Quality grade

High level of quality

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

Analysis

The Departments have a high level of financial autonomy and they manage the resources in an appropriate way, providing also the support for the maintenance of the expensive equipment (e.g. Department of Chemistry and Physics).

The 66,77% of the Faculty revenues were State budget revenues in 2019 and 56,29% in 2020. (Table 1. A breakdown of Faculty of Science revenue for 2019 and 2020, pg. 115, Self-evaluation), mostly to cover employee salaries and other employee-related expenditures. In 2019 revenue from the budgets of other public sources (Croatian Science Foundation, infrastructural funds, projects financed by international organisations and institutions, EU bodies and City of Zagreb) accounted for 21.09% of the total revenue, and in 2020 these revenues increased to 35.32% of the total income of the Faculty, which compensated lower income from state budget in that year.

The own activity income of the Faculty (including the tuition fees, scientific and professional projects and rental income, as well as special regulation income and other unspecified income) represented 12,14 % of the total operating income of the Faculty (201.652.486,5 kn) in 2019, and 8,38 % of the total operating income of the Faculty (269.239.356,05 kn) in 2020 (Table 4.11 Financial evaluation – income, in the Analytic_supplement(119)_PMFZ).

Recommendations for improvement

- It is recommended to establish the Faculty board for infrastructure, to design and implement the strategic management of the existing infrastructure resources and the new investments (new buildings).
- It is recommended to manage the part of the resources at the Faculty level, to provide the financial support for the strategic projects/activities.

Quality grade

Satisfactory 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

The teachers and associates employed at HEI strive to be very 'academically visible' in their respective research fields. They do so by publishing in high impact peer-reviewed international journals, through conference participations, external project funding, number of PhDs defended. Clearly there are differences among departments, reflecting that not all science domains have equal publication cultures and/or their approach to science is identical (slow vs fast science). This heterogeneity is typical of an (re)accreditation at institute level. Overall, the panel evaluates the quality and quantity of the scientific research output to be satisfactory, which is corroborated by the evidence put forward by the HEI (Table 5.1.a) and when talking to the staff.

Good practices, like having awards systems, or giving financially support to those who aim at submitting very competitive research grants is acknowledged, and should be implemented across all departments. The Faculty of Science at the University of Zagreb is a leading institute in Croatia, and has as such a high scientific impact.

Recommendations for improvement

- Although in absolute numbers the quantity of publications is high, strive to publish in higher impact journals. Aim high first (Q1), and if not successful then go to Q2, Q3. Avoid publishing in Q4 rated journals unless these are journals published in Croatian language by e.g., the Croatian chemical society.
- Develop across departments awards systems, and give financially support to those staff members who aim at submitting very competitive research grants (Horizon Europe, ERC).
- Develop and financially support (at faculty level) a strategy towards open access (OA) journals. OA will become more and more the norm, and it is sometimes already obligatory in the case of European funding. OA journals can contribute to higher citations, but be selective about the type of journal for which you pay for OA. Also, be critical about spending money on once-off showcasing (covers of journals). In both OA and showcasing evaluate the lasting impact of the investment.
- PhDs in English increase scientific recognition. Make this standard, but at the same do not neglect local traditions and language. A PhD written in English with an obligatory summary in Croatian has a higher scientific impact than a PhD written entirely in Croatian with an English summary. Explore the pros/cons of

other formats, models (Scandinavian PhD model). The same holds for the discussion of a monograph versus an article-based PhD.

Quality grade

Satisfactory 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

The HEI is nationally (and in some disciplines internationally) recognised for the social relevance of its research. This is evidenced by the large number of projects that has important societal deliverables, and where the funding agency stems from industry and public sectors. It is important to note that the panel sees this social relevance across all departments (from mathematics to biology, from (geo)physics to geography, from geology to chemistry). The 22 March 2020 earthquake made clear that the general public turns to the HEI for interpretation, explanation, and conclusions. The same holds true for the impact of the COVID19 pandemic. However, and all the more so, the HEI is contacted by industry, regional and national government, academia (inside and outside Croatia), stakeholders in general when research participation is needed. The HEI has an excellent track record when it comes to transfer of knowledge in all kind of different forms and format (interviews, spin-offs, patents, memberships, etc.).

Recommendations for improvement

- Continue to cherish the strong and good relationship between the HEI and economic and public sectors, and do this by staying in contact with one another by means of a newsletter, 'what's new at the faculty', HEI meets industry-industry meets the HEI, etc. Use this strong embeddedness to be informed about new research strands and societal needs.
- Use input from industry (and maybe look for co-finance structures) when applying for new equipment.
- when applying for external EU funding involve your profit and non-profit stakeholders to maximize (apart from scientific output) the economic and societal valorisation.
- Continue to develop the Career Centre
- Continue to develop a policy towards external sponsorship and donations (as was done after the earthquake).

Quality grade

High 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

The HEI experiences a wide recognition of its scientific achievements when it comes to regional, national, and in some domains, international contexts. At the regional and national level HEI staff members across all departments showcase acknowledgment by means of awards, invited lectures, academic recognition, project participation, and exceptional achievements. The presence of three ERC grant holders is a strong mark of international recognition. The same holds for the participation in EU funded projects, the invited participation at international conferences, and editorial board memberships. That the HEI aims to maintain this course of action is also clearly indicated in the SciStrat document.

Recommendations for improvement

- The production of required financial reports from ERC holders should be managed by the administration so that the researcher can dedicate much easier to his scientific activity.
- Be self-critical when submitting papers to and participating in conferences. Over the last 5 years over 2400 presentations were given at conferences. From the point of view of visibility and networking this is great, but try to aim at these conferences that have high scientific impact, and tangible post-conference output (special issues, listed WoS proceedings).
- Be critical in accepting editorial board membership invitations of lower ranked journals. Have no fear in suggesting yourself to high ranked journals to do review work and present yourself to be considered as a potential new board member to these high(er) ranked journals.

Quality grade

Satisfactory level of quality

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

Analysis

Sustainability and having a development strategy is evidenced in the Faculty's SciStrat document. The HEI aims "to respond to the challenges of the sustainability of humankind and the environment" (p.3). The participation in a number of projects with clear sustainability goals and deliverables is an important indicator. Examples across disciplines are ample: preservation and management of Croatia's coastal areas, regional

and spatial development, sustainable tourism, climate and global warming, etc. If research aims to be developmental, more interdisciplinary and multidisciplinary research approaches, linked to the economy should be stimulated. This strategic goal is an important driver for the HEI.

Recommendations for improvement

- Stimulate more interdisciplinary study research by establishing joint research in the sciences across disciplines.
- Organize symposia/lectures across disciplines.
- To stimulate and keep staff committed to go for high scientific research install an award system across all disciplines. These reward systems do not necessarily have to be financial, recognition (by the department, faculty, university) and they can also be a strong motivator. Take these recognitions into account when promoting people.
- Further stimulate and encourage collaboration across departments in relation to HR management, and investment in equipment.
- Continue to develop a long-term financial strategy in which justification for expenditures are evaluated on their long(er) term impact.

Quality grade

Satisfactory level of quality

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

Analysis

The HEI invests in continuous efforts to improve the teaching process at undergraduate, graduate, and post-graduate level by strongly connecting scientific research and teaching activity. It was done by the implementation of the recommendations of the previous accreditation panel (in 2015) plus through evidence provided of student involvement in projects, joint publications, the use of equipment and labs needed for research in teaching. The welcomed doctoral study programs in which research and teaching are linked are also strong evidences.

Recommendations for improvement

- Develop a strategy where results from excellent Master theses are published in peer-reviewed papers.
- Let doctoral students to be involved in some teaching (but within reason), use graduate students to collect/interpret data for research.
- Create a student-researcher status with appropriate motivation

Quality grade

High level of quality

APPENDICES

1. Quality assessment summary - tables

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

<i>Quality grade by standard</i>				
<i>I. Internal quality assurance and the social role of the higher education institution</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
1.1. The higher education institution has established a functional internal quality assurance system.			X	
1.2. The higher education institution implements recommendations for quality improvement from previous evaluations.			X	
1.3. The higher education institution supports academic integrity and freedom, prevents all types of unethical behaviour, intolerance and discrimination.		X		
1.4. The higher education institution ensures the availability of information on important aspects of its activities (teaching, scientific/artistic and social).			X	
1.5. The higher education institution understands and encourages the development of its social role.				X
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.				X
2.2. The intended learning outcomes at the level of study programmes delivered by the higher education institution are aligned with the level and profile of qualifications gained.				X
2.3. The higher education institution provides evidence of the achievement of intended learning outcomes of the study programmes it delivers.			X	
2.4. The HEI uses feedback from students, employers, professional organisations and alumni in the procedures of planning, proposing and approving new programmes, and revising or closing the existing programmes.		X		
2.5. The higher education institution ensures that ECTS allocation is adequate.			X	
2.6. Student practice is an integral part of study programmes (where applicable).		X		

Quality grade by standard

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

<i>Quality grade by standard</i>				
<i>IV. Teaching and institutional capacities</i>	<i>Unsatisfactory level of quality</i>	<i>Minimum level of quality</i>	<i>Satisfactory level of quality</i>	<i>High level of quality</i>
4.1. The higher education institution ensures adequate teaching capacities.				X
4.2. Teacher recruitment, advancement and re-appointment is based on objective and transparent procedures which include the evaluation of excellence.		X		
4.3. The higher education institution provides support to teachers in their professional development.		X		
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.		X		
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.				X
4.6. The higher education institution rationally manages its financial resources.			X	

Quality grade by standard

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

2. Site visit protocol

Reakreditacija
Prirodoslovno-matematičkog fakulteta
Sveučilišta u Zagrebu

Horvatovac 102 a, Zagreb

Re-accréditation of the
Faculty of Science
University of Zagreb

Horvatovac 102 a, Zagreb

Edukacija članova stručnog povjerenstva u virtualnom okruženju / Education of panel members in virtual form

	Četvrtak, 6. svibnja 2021.	Thursday, 6th May 2021
09:50 -10:00	<ul style="list-style-type: none">• Spajanje na poveznicu (link) ZOOM	<ul style="list-style-type: none">• Joining the ZOOM meeting via the link
10:00 -11:30	<ul style="list-style-type: none">• Predstavljanje AZVO-a• Predstavljanje sustava visokog obrazovanja u RH• Postupak reakreditacije• Standardi za vrednovanje kvalitete• Kako napisati Završno izvješće	<ul style="list-style-type: none">• Presentation of ASHE• Overview of the higher education system in Croatia• Re-accréditation procedure• Standards for the evaluation of quality• How to write the Final report

Priprema članova stručnog povjerenstva za sastanke s visokim učilištem u virtualnom okruženju/Education of panel members for the meetings with HEI in virtual form

	Ponedjeljak, 10. svibnja 2021.	Monday, 10th May 2021
09:50 -10:00	<ul style="list-style-type: none"> • Spajanje na poveznicu (link) ZOOM 	<ul style="list-style-type: none"> • Joining the ZOOM meeting via the link
10:00 -13:00	<ul style="list-style-type: none"> • Priprema povjerenstva za posjet visokom učilištu (rasprava o Samoanalizi i popratnim dokumentima) 	<ul style="list-style-type: none"> • Preparation of the Expert Panel members for the site visit (discussion on the Self-evaluation report and supporting documents)

Preliminarni posjet Stručnog povjerenstva visokom učilištu / Preliminary site-visit of Expert Panel members to the HEI

	Utorak, 11. svibnja 2021.	Tuesday, 11th May 2021	Prezime i ime sudionika Surname and name of the participants
8:50- 9:00	Spajanje članova Povjerenstva na poveznicu (link) ZOOM	Joining the Expert Panel members to the ZOOM meeting via link	
9:00 - 10:00	Sastanak članova stručnog povjerenstva s dekanom i prodekanima	Meeting of Expert Panel members with the Dean and Vice-Deans	
10:00 - 11:00	Sastanak članova stručnog povjerenstva s pročelnicima odsjeka	Meeting of Expert Panel members with the Heads of Departments	
11:00 - 13:00	Obilazak fakulteta (predavaonice, laboratoriji,	Tour of the Faculty (classrooms, laboratories, computer	

	informatičke učionice, knjižnica, studentske službe) i prisustvovanje nastavi	classrooms, library, student services) and participation in teaching classes	
13:00 – 14:00	Analiza dokumenata	Document analysis	
14:00 –	Radni ručak, odlazak domaćih članova	Working Lunch, return of Croatian Expert Panel members	

Prvi dan reakreditacije u virtualnom okruženju / First day of re-accreditation in virtual form

	Srijeda, 12. svibnja 2021.	Wednesday, 12th May 2021	Prezime i ime sudionika Surname and name of the participants
9:50 – 10:00	Spajanje na poveznicu (link) ZOOM	Joining ZOOM meeting via the link	
10:00 – 10:30	Sastanak članova stručnog povjerenstava, diskusija o opažanjima i impresijama s preliminarnog posjeta, priprema za sastanke s dionicima visokog učilišta	Meeting of Expert Panel members, discussion on observations and impressions from the preliminary site-visit, preparation for the meetings with HEI stakeholders	
10:30 – 11:15	Sastanak članova stručnog povjerenstva s Povjerenstvom za upravljanje kvalitetom	Meeting of Expert Panel members with the Committee for Quality Assurance	
11:15 – 11:30	<i>Pauza</i>	<i>Break</i>	
11:30 – 12:30	Sastanak članova stručnog povjerenstava s prodekanom za nastavu i pomoćnicima pročelnika za nastavu i studijske programe	Meeting of Expert Panel members with Vice-dean for teaching and Assistant Heads of Departments for teaching and study programmes	

12:30 - 13:30	<i>Pauza</i>	<i>Break</i>	
13:30- 14:15	Sastanak s nastavnicima (u stalnom radnom odnosu, osim onih na rukovodećim mjestima)	Meeting with full-time employed teachers, except those in managerial positions	
14:15 - 14:30	<i>Pauza</i>	<i>Break</i>	
14:30 - 15:15	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions, if needed	
15:15 -	Interni sastanak članova stručnog povjerenstva – osvrt na prvi dan i priprema za drugi dan	Internal meeting of the Expert Panel members – comment on the first day and preparation for the second day	

Drugi dan reakreditacije u virtualnom okruženju / Second day of re-accréditation in virtual form

	Četvrtak, 13. svibnja 2021	Thursday, 13th May 2021	Prezime i ime sudionika Surname and name of the participants
9:00 - 9:30	Spajanje na poveznicu (link) ZOOM i kratki interni sastanak stručnog povjerenstva	Joining ZOOM meeting via the link and a short internal meeting of the Expert Panel members	
9:30 - 10:15	Sastanak sa: <ul style="list-style-type: none"> • predsjednikom Etičkog povjerenstva • predsjednikom Stegovnog povjerenstva 	Meeting with: <ul style="list-style-type: none"> • Head of the Ethics Committee • Head of Disciplinary Committee 	

	<ul style="list-style-type: none"> • povjerenikom za prijavu nepravilnosti • voditeljem Centra za karijere • voditeljem Ureda za međunarodnu suradnju i praćenje projekata 	<ul style="list-style-type: none"> • Commissioner for irregularities • Head of Career Centre • Leader of the Office for international cooperation and projects 	
10:15 - 10:30	<i>Pauza</i>	<i>Break</i>	
10:30 - 11:30	Sastanak sa studentima	Meeting with students	
11:30 - 11:45	<i>Pauza</i>	<i>Break</i>	
11:45 - 12:30	Sastanak s alumnijima (bivši studenti koji nisu zaposlenici visokog učilišta)	Meeting with Alumni (former students who are not employed by the HEI)	
12:30 - 13:15	Sastanak s vanjskim dionicima	Meeting with External Stakeholders	
13:15 - 14:15	<i>Pauza</i>	<i>Break</i>	
14:15 - 15:00	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions, if needed	
15:00 -	Interni sastanak članova stručnog povjerenstva – osvrt na drugi dan i priprema za treći dan	Internal meeting of the Expert Panel members – comment on the second day and preparation for the third day	

Treći dan reakreditacije u virtualnom okruženju / Third day of re-accréditation in virtual form

	Petak, 14. svibnja 2021.	Friday, 14th May 2021	Prezime i ime sudionika Surname and name of the participants
9:40 – 10:00	Spajanje na poveznicu (link) ZOOM i kratki interni sastanak stručnog povjerenstva	Joining ZOOM meeting via the link and a short internal meeting of the Expert Panel	
10:00 – 10:45	Sastanak članova stručnog povjerenstava s prodekanom za znanost, projekte i suradnju s gospodarstvom i prodekanom za međunarodnu suradnju	Meeting with the Vice-Dean for science, projects and commercial cooperation and Vice-Dean for International Cooperation	
10:45 – 11:00	<i>Pauza</i>	<i>Break</i>	
11:00 – 11:40	Sastanak s voditeljima znanstvenih projekata	Meeting with the Heads of research projects	
11:40 – 11:50	<i>Pauza</i>	<i>Break</i>	
11:50 – 12:30	Sastanak s asistentima i poslijedoktorandima	Meeting with Teaching Assistants and postdoctoral researchers	
12:30 – 13:00	Interni sastanak članova stručnog povjerenstva	Internal meeting of the Expert Panel members	
13:00 – 13:30	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions, if needed	
13:30 – 13:45	Završni sastanak s dekanom i prodekanima	Exit meeting with the Dean and Vice-Deans	
13:45 –	Sastanak članova stručnog povjerenstva – ocjenjivanje prema standardima kvalitete	Internal meeting of the Expert Panel members – assessment according to quality standards	



SUMMARY

The evaluation process of the Faculty of Science of the University of Zagreb has taken place at a juncture in time which is overshadowed by the recent earthquake in the city as well as the global pandemic. The panel recognises the extreme challenges that both of these events present to the Faculty of Science. The panel wishes to recognise the very considerable effort made at all levels of the Faculty to meet the reporting standards of the evaluation, to supply the necessary documentation on time, and to participate fully in the most open and interactive manner with the members of the evaluation panel. These are all signs of a considerable administrative and organisational effort which we wish to formally recognise here.

This is the 2nd evaluation of its kind at the faculty level. At the conclusion of the last evaluation, the country of Croatia stood at the threshold of accession to the European Union, with all of the promise and the challenges that accompanied it. For those of us who were present at the last evaluation and can draw the most direct comparisons, we see tremendous progress and great change. We also see clearly that the Faculty of Science is not at the end of this process and that a number of challenges remain.

In this report the panel members have made great efforts to inspect and investigate in detail all of the symptoms of this great process of advancing the Faculty of Sciences to its rightful position in the top league of European research faculties. It is in this spirit, and with the expectation that you are capable of everything in the long run, that we present you with this report containing a large and well-documented list of recommendations for improving your institution and for accelerating you on your path to the top.

Your intentions are clearly the best, there is no doubt. Thus many, perhaps most, of the recommendations have the character of instituting Faculty mechanisms, responsibilities and safeguards to ensure the greatest satisfaction of your students, your staff, your faculty and your external stakeholders in the near future. Following these recommendations will also have the welcome side-effect of greater support, both societal and political, in the coming years.

We wish you the best of possible futures in the coming period and we are certain that the leaps in improvement of the past years will be compounded in the coming ones.