

**REPORT
OF THE EXPERT PANEL
ON THE
RE-ACCREDITATION OF
UNIVERSITY OF RIJEKA,
FACULTY OF PHYSICS**

**Date of site visit:
20-22 May 2026**

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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 the 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 151/2022) 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 in higher education and science.

The Agency's Accreditation Council appointed an Expert Panel to conduct an independent evaluation of the University of Rijeka, Faculty of Physics.

Members of the Expert Panel:

- Dr. Kateryna Lemishko Lemishko, Panel chair, Spanish National Research Council, Kingdom of Spain,
- Prof. Leonardo Marušić, University of Zadar, Republic of Croatia,
- Prof. Marija Raguž, School of Medicine, University of Split,
- Prof. Suzana Miodragović, School of Applied Mathematics and Informatics, J. J. Strossmayer University of Osijek,
- Ena Vicković, student, University of Zagreb Faculty of Chemical Engineering and Technology.

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

- Management,
- Members of the Committee responsible for preparing the Self-Evaluation Report and the Committee for Quality Assurance and Enhancement,
- Students,
- Alumni,
- External stakeholders and professional partners with which the Faculty cooperates,
- Full-time teaching staff,
- Teachers and heads of study programmes,
- Representatives responsible for science, mobility and organisational/research units,
- Heads of research and professional projects,
- Assistants and senior assistants.

The Expert Panel members visited the work facilities, laboratories, the library, IT classrooms, student administration office and classrooms, and attended sample lectures.

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

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

The Report contains the following elements:

- Short description of the evaluated higher education institution,
- Brief analysis of the institutional advantages and disadvantages,
- List of institutional good practices,
- Analysis of each assessment area, recommendations for improvement and quality grade for each assessment area,
- Detailed analysis of each standard, recommendations for improvement and quality grade for each standard,
- Appendices (quality assessment summary by each assessment area and standard, and the site visit protocol),
- Summary.

In the analysis of the documents, site visit to the University of Rijeka, Faculty of Physics and writing of the Report, the Expert Panel was supported by:

- Mina Đorđević, coordinator, ASHE,
- Vedrana Vojković Estatiev, interpreter at the site visit, ASHE.

The Agency shall take a decision to issue a licence.

On the basis of the reasoned proposal of the Accreditation Council, and the response of the Complaints Committee if a complaint has been filed, the Agency shall take a decision to issue a letter of expectation i.e. revoke the licence for the operation of a higher education institution or to revoke the licence for delivering a study programme, within a maximum of 30 days upon receiving the reasoned proposal or the response of the Complaints Committee.

The decision to issue a letter of expectation shall define the measures that a higher education institution should take in order to meet the criteria for the operation of a higher education institution or a to meet the criteria for delivering a study programme, as well as the deadline for taking said measures.

There shall be no possibility of appeal against the decision of the Agency, but an administrative dispute may be initiated.

SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION

NAME OF HIGHER EDUCATION INSTITUTION: University of Rijeka, Faculty of Physics

ADDRESS: Ulica Radmile Matejčić 2, 51000 Rijeka

DEAN: Prof. Rajka Jurdana-Šepić, PhD

ORGANISATIONAL STRUCTURE: The Faculty of Physics is a constituent unit of the University of Rijeka. It is organised into organisational units defined by its internal acts, including units responsible for teaching, research, laboratories and professional work. The main scientific and teaching activities are carried out in the fields of physics and related interdisciplinary areas. The Faculty also cooperates with other constituents of the University of Rijeka in delivering physics-related courses and interdisciplinary study programmes.

STUDY PROGRAMMES: The Faculty delivers the following study programmes:

- University undergraduate study programme in Physics;
- University graduate study programme in Physics;
- University graduate study programme in Engineering and Material Physics;
- University graduate study programme in Physics and Informatics;
- University graduate study programme in Physics and Mathematics;
- University graduate study programme in Physics and Philosophy;
- Doctoral study programme in Physics.

The Faculty also delivers physics courses for other constituents of the University of Rijeka and offers lifelong learning activities.

NUMBER OF STUDENTS: In the evaluated academic year, the Faculty had 99 full-time students and 12 part-time students. By programme, this included:

- 60 full-time students in the undergraduate Physics programme;
- 7 full-time students in Engineering and Material Physics;
- 12 full-time students in the graduate Physics programme;
- 3 full-time students in Physics and Informatics;
- 0 students in Physics and Mathematics;
- 0 students in Physics and Philosophy;
- 17 full-time and 12 part-time students in the doctoral study programme in Physics.

NUMBER OF TEACHERS: The Faculty employs 24 full-time teachers, including 22 in scientific-teaching positions and two in teaching positions. Teaching is also supported by six assistants and senior assistants. In addition, two teachers are engaged at the Faculty on a part-time basis, both elected in the field of Physics.

SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION:

The Faculty of Physics is a constituent unit of the University of Rijeka. It developed from the former Department of Physics, which became the Faculty of Physics in 2022. The Faculty carries out teaching, scientific research and professional activities in physics and related interdisciplinary areas.

The Faculty offers study programmes at undergraduate, graduate and doctoral level. Its programme portfolio includes research-oriented, teacher-education and interdisciplinary programmes. The Faculty also participates in teaching for other University constituents.

The Faculty's mission is to advance science and education through research, to educate experts for different sectors, to educate future physics teachers, and to contribute to scientific, technological and social challenges. Its main research and teaching activities are supported by laboratories and research infrastructure.

The Faculty has a relatively small number of students. Several graduate programmes have very low or no enrolment, while the undergraduate Physics programme and the doctoral programme have the largest numbers of students. This programme structure and enrolment pattern are relevant for assessing the sustainability of the study programmes and the teaching workload of staff.

A BRIEF ANALYSIS OF THE INSTITUTIONAL ADVANTAGES AND DISADVANTAGES

ADVANTAGES OF THE INSTITUTION

1. Strong and active research profile for a small faculty, with good scientific productivity, project activity and international collaboration.
2. Good research facilities and laboratories, which support both research and student development.
3. Strong doctoral programme, well connected with the Faculty's research areas and supported by a good supervision culture.
4. Committed staff and very close communication between teachers, students and programme coordinators.
5. Highly student-centred learning environment, with individualised support made possible by small cohorts.
6. Strong outreach and science popularisation activities, including cooperation with schools, pupils and the wider public.
7. Well-established quality assurance procedures, with evidence that the Faculty uses documentation, student feedback and internal discussion for improvement.

DISADVANTAGES OF THE INSTITUTION

1. Very low or no enrolment in several graduate study programmes, raising questions about long-term sustainability.
2. High teaching workload for staff, partly connected with maintaining several study programmes with small cohorts while also delivering physics courses for other University constituents.
3. Limited institutional autonomy in some management areas, especially financial autonomy and hiring, due to the Faculty's organisational status within the University.
4. Programme changes appear administratively demanding, which may slow down curricular improvement.
5. Alumni and external stakeholder feedback exist, but the formal feedback loop and its impact on programme revision are not always clearly visible.
6. Lifelong learning activities are relevant, but demand and impact appear limited.
7. Administrative support for project preparation and implementation appears limited, which increases the workload of academic staff.
8. International mobility is supported, but outgoing students may face practical difficulties with course equivalence and recognition of ECTS credits.

LIST OF INSTITUTIONAL GOOD PRACTICES

EXAMPLES OF GOOD PRACTICE

1. Very close communication between teachers and students, supported by small cohorts.
2. Early involvement of students in research and project activities.
3. Use of research infrastructure in teaching, student development and doctoral training.
4. Strong doctoral programme that supports research development and student mobility.
5. Outreach and science popularisation activities, including activities with schools, pupils and the local community.
6. Responsive informal communication with students, including examples where feedback led to concrete improvements.
7. Application of open science principles through the institutional repository and open access to research outputs.

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

I. Higher education institution management and quality assurance

Analysis

The University of Rijeka is one of the four Croatian universities that existed before the country became independent, which means that it inherited the structure common in the former Yugoslavia, with each faculty (an organizational unit of the university) being a legal entity. As opposed to that, the smaller universities, established after the country became independent, consist of units (mostly departments) which are not legal entities. In other words, in the Croatian higher education system the difference between a faculty and a department, as the organizational units of a university, is that one is a legal entity, while the other is not.

However, in 2007 the University of Rijeka established several new organizational units, which were not legal entities, and called them departments. One of these was the Department of Physics, based on the more than 40 years long tradition of education of physics teachers at the University of Rijeka. For visibility reasons, in 2022, the department became the Faculty of Physics, but unlike most other faculties at the University of Rijeka, it is still not a legal entity, as it is repeatedly emphasized in the Self-Evaluation Report.

This needed to be emphasized to clarify the confusion, since it is not just an insignificant formality. It means the Faculty does not have complete financial autonomy, and it is not fully independent in its hiring policy. All this has serious consequences to the management, but within these limitations, the Faculty is well organized and managed, making the best of the situation. The biggest challenge comes from the low enrolment, not from the organizational structure, and the management is doing their best to deal with it.

Lack of administrative support is also a challenge, especially with the increasing number of research projects, requiring extensive project management, and again the fact that the Faculty is not a legal entity limits the ability of the management to deal with this issue.

The quality assurance system is well established, with all the necessary components and procedures in place. All these procedures, especially the internal evaluations done at the university level, in preparation for this external evaluation, involved not just students and staff, but also various external stakeholders. Since the last reaccreditation, significant effort has been made to include alumni in various activities, and one of the examples is a quality assurance committee member who is a former student, currently at a post-doc position in Austria. However, the alumni club, even though it does exist, could be better organized.

The most challenging part of the quality assurance system is obtaining useful information from the student surveys, and the challenge comes from the omnipresent low enrolment issue. On one hand, the essential element necessary to obtain reliable results from surveys is anonymity, and that is clearly hard to achieve if there are just one or two students enrolled in a certain programme. On the other hand, analysis of the data obtained through surveys is basically statistical, and reliable statistics require large numbers. To deal with that, the Faculty accumulates the survey results over a longer period (several years), before analysing the obtained data, which is the only possible approach, but still does not guarantee useful results.

Recommendations for improvement

- Take steps to include more former students, especially the ones who are still in Rijeka, in the alumni club, and to intensify the activities of the club.
- Try to design a different approach to the low enrolment issue, since it is clearly the biggest problem, threatening to endanger the sustainability of the Faculty.
- Explore the possibilities to hire additional administrative personnel, or to obtain more comprehensive assistance from the university level in the project management.

Quality grade

The assessment area is completely fulfilled.

II. Study programmes and lifelong learning programmes

Analysis

Based on the submitted documentation and the meetings held during the site visit, the Panel found that the study programmes are coherent and broadly aligned with the Faculty's mission and strategic goals. The programmes support research-based education in physics, the education of experts for different sectors, teacher education, and contribution to scientific and societal needs.

The study programmes are based on defined learning outcomes documented at programme and course level. These outcomes cover core physics, theoretical and mathematical foundations, laboratory and experimental work, programming, data analysis, scientific communication,

teacher-education competences, and specialised areas such as astrophysics, materials physics, environmental physics and medical physics.

The Panel found a strong connection between teaching and research. Students can become involved in research activities relatively early, often after encountering a topic through a course. Staff and project leaders confirmed that students can contribute to research work and, in some cases, produce results suitable for publication or conference presentation. Alumni and supervisors gave positive feedback on students' preparation for research and doctoral studies.

Student practice is integrated where applicable. The Faculty has cooperation agreements with external organisations, while students may also propose their own placement. Practice is evaluated through student reports and feedback from external mentors or supervisors. Teacher-education programmes include school practice and subject-specific methodology courses.

At the same time, the Panel identified several issues that need further attention. The main one is the sustainability of programmes with very low or no enrolment. The Faculty is aware of this and has already discussed or taken some steps, but a clearer strategy for the programme portfolio is still needed. Site-visit discussions also indicated that formal changes to study programmes are administratively demanding, which may slow down larger improvements. Programming, data analysis and computational skills are included in the programmes, but could be further strengthened with more continuity and depth, taking into account both research needs and modern expectations in industry and other career paths.

Lifelong learning is present and linked to the Faculty's expertise, but demand for some activities remains limited. This is the least developed part of the assessment area.

Recommendations for improvement

- Develop a clearer strategy for the sustainability of study programmes with very low or no enrolment, including possible restructuring, merging, suspension or closure of programmes or programme elements.
- Continue strengthening programming, data analysis and computational skills with greater continuity and depth, taking into account both research needs and modern expectations in industry and other career paths.
- Make the use of feedback from students, alumni, external stakeholders, practice mentors and employers more visible, especially by documenting how such feedback leads to programme changes.
- Focus lifelong learning activities on areas where there is clear external demand and where the Faculty's expertise, facilities and professional services provide clear added value.

Quality grade

The assessment area is completely fulfilled.

III. Student-centred learning and teaching – teaching process and student support

Analysis

The Expert Panel found that the Faculty provides a highly student-centred learning environment characterised by close communication between students, professors and programme coordinators. Due to the relatively small number of students, the Faculty is able to offer an individualised approach and provide timely academic and administrative support throughout the study process. Students expressed a high level of satisfaction with the accessibility of professors, mentors and coordinators and confirmed the communication channels, such as Merlin, are effective and responsive.

Teaching is organised through a combination of lectures, laboratory work, project-based assignments and research-related activities, enabling students to actively participate in the learning process and develop both theoretical and practical competences. Students confirmed that laboratory facilities, digital learning platforms and other teaching resources adequately support the achievement of intended learning outcomes.

Assessment procedures were described as transparent, fair and consistently applied across courses. Students reported receiving feedback on their work and highlighted the willingness of professors to discuss assessment outcomes and provide additional guidance when necessary. The Faculty also demonstrates sensitivity towards students facing academic, personal or health-related difficulties and provides individual accommodations where appropriate.

Information regarding enrolment procedures, progression requirements, mobility opportunities and student support services is publicly available and clearly communicated. Students emphasised the important role of programme coordinators, mentors and Erasmus coordinators in supporting their academic progress and facilitating participation in international mobility programmes.

Overall, the Expert Panel found that the Faculty provides a supportive and student-oriented environment that effectively promotes student success, participation and academic development.

Recommendations for improvement

- Continue strengthening cooperation with alumni and create more opportunities for students to interact with graduates and employers.
- Continue encouraging student participation in course evaluation surveys and further strengthen confidence in the anonymity of feedback processes.
- Continue developing support mechanisms for international mobility and explore possibilities for facilitating recognition of courses and ECTS credits obtained abroad.
- Continue improving opportunities for student participation in scientific conferences, professional events and extracurricular activities.

Quality grade

The assessment area is completely fulfilled.

IV. Teaching capacities and infrastructure of the higher education institution

Analysis

Based on available documents and meetings held the Panel members concluded that the number of the Faculty's own full-time staff employed is sufficient to cover all study programmes and the teachers are qualified to deliver the courses assigned to them. The student-to-full-time-teacher ratio is 2.03, which is significantly below the permitted value of 30. This ensures a very high quality of teaching, although it also suggests a relatively small number of students. Additionally, Faculty teaching staff conduct classes at other constituents of the University of Rijeka and vice versa. The teaching workload is substantial and is generally in line with relevant legislation and policies; however, in some cases it exceeds the prescribed norm. In our view, this heavy workload may negatively affect staff members' scientific activities.

Procedures for the recruitment, advancement and re-appointments to scientific-teaching and teaching positions are conducted in accordance with legal regulations, and the announcement of vacant positions and it is carried out in line with the Faculty's Strategy. The conditions and procedures for appointments, reappointments, conclusion of employment contracts, and other related matters are prescribed by law, the Statute of the University of Rijeka, and other general acts. The Faculty does not have specifically prescribed competitive criteria for selecting outstanding candidates for each position, nor does it apply additional excellence-based recruitment criteria beyond the minimum requirements set by national legislation. Excellence is assessed on a case-by-case basis.

The Faculty ensures support to teachers in their professional development. The level of scientific and professional mobility among staff is quite good, while teaching mobility is relatively low. So far, no requests for sabbatical leave have been submitted, likely due to the significant teaching workload. At the same time, the administrative workload is increasing, while the number of administrative staff has not grown sufficiently.

The adequate premises, equipment and the complete infrastructure are provided. Lecture halls occupy approximately 400 m². In addition, teaching takes place in practical classrooms, teaching laboratories, four workshops, and one additional space. The total area used for teaching is approximately 1200 m². Equipment used for scientific research is also available to students. In our opinion, one of the Faculty's major strengths are its modern facilities and research equipment, together with plenty of space for expansion. The Faculty significantly increased investments in teaching and scientific equipment.

The library and its equipment provide almost everything required for a high-quality of study, and scientific-teaching activities. However, literature in the library is not available for some study programmes with a small number of students.

The Faculty management has taken various measures to stabilize finances. The number of physics students is declining at both undergraduate and graduate levels, which has a negative impact on finances because of reduced tuition income. However, the Doctoral Study of Physics has generated some increase in this source of income. The Faculty also generates funds through national and international projects, collaboration with the industry sector, and cooperation with the local community. Compared with the previous reaccreditation process conducted in 2021, the number of active scientific projects has increased.

Recommendations for improvement

- The main recommendation in this area is to reduce the teaching workload, as it negatively affects staff members' scientific activities and mobility. This is not easy to achieve, since the ability to hire additional staff is significantly limited by laws and regulations. One possible way to reduce the teaching workload would be to decrease the number of study programmes. The student-to-full-time-teacher ratio at the Faculty is too low. The Faculty management should make additional efforts to attract more students.
- To ensure long-term financial sustainability, project activity should be increased. The Faculty should place greater emphasis on enabling teaching staff to apply for competitive projects. This would also make it possible to hire new staff who could contribute to teaching and help reduce the overall teaching workload, as well as additional administrative staff to support the administration of new projects. We also recommend continuing collaboration with international institutions, the industry sector, and the local community. In addition, the Faculty management should consider further measures to encourage and facilitate mobility opportunities, especially sabbaticals. The library staff should make additional efforts to provide literature for study programmes with a small number of students.

Quality grade

The assessment area is completely fulfilled.

V. Research/ artistic and professional activity

Analysis

The Expert Panel considers that the Faculty of Physics maintains a strong and high-quality research profile in several internationally relevant areas of physics and achieves very good results in scientific productivity, international collaboration, and project activities. Since 2018, the Faculty has been recognizing outstanding scientific publications of its academic staff and researchers, thereby actively promoting its research achievements.

Research activities are closely integrated with the teaching process, particularly with the doctoral programme, ensuring that early-career researchers are involved in cutting-edge research and international scientific networks. Over the past five years, research results have been presented at a large number of scientific conferences, where staff members delivered numerous presentations, including a significant number of invited talks. This further enhances the Faculty's international visibility and recognition within the scientific community.

The Faculty also organizes and co-organizes scientific conferences that are recognized at both the national and international levels. The Expert Panel particularly highlights the active participation of academic staff in international research collaborations, many of which have emerged through involvement in a large number of research and several professional projects, either as project coordinators or collaborators. A significant increase in project activity is evident compared to the previous reaccreditation period (2015–2020). Staff members actively apply for national and European funding opportunities, and during the last five years they have participated in 48 research projects, three professional projects, one Croatian Qualifications Framework (CROQF)

implementation project, and two mobility projects. This has contributed to the overall growth of the Faculty's revenues. All members of the academic and research staff participate in at least one project.

During the site visit, the Expert Panel observed that project activities have significantly contributed to the modernization of research equipment and the development of research infrastructure. Discussions with staff indicated a highly positive working environment and a strong commitment among employees. On the other hand, insufficient administrative support for project preparation and implementation was identified as a challenge, resulting in some academic staff assuming a considerable administrative workload in addition to their teaching and research responsibilities.

The Panel also notes the active involvement of the Faculty staff in national and international scientific and professional bodies. Further evidence of the quality of research activities is provided by the active participation of staff members in the peer-review processes of scientific publications and research projects. The Faculty contributes to society through science outreach activities, cooperation with educational institutions, public bodies, and other external stakeholders, as well as through participation in projects addressing socially relevant issues.

The doctoral programme in Physics is aligned with the Faculty's strategic objectives and contemporary scientific developments. It enables doctoral candidates to engage in high-quality research, participate in international mobility activities, and acquire the competencies necessary for independent scientific work. The Expert Panel also positively evaluates the systematic implementation of Open Science principles, including the institutional repository, open access to research outputs, and support provided to researchers in applying modern Open Science standards.

Recommendations for improvement

The Expert Panel recommends that the Faculty continue to strengthen its participation in internationally competitive research projects and further develop international collaboration in research activities. It is also recommended that the Faculty establish a more systematic approach to monitoring and evaluating the societal and professional impact of its research, professional, and science outreach activities.

- The Faculty should continue to develop cooperation with industry, educational institutions, and other external stakeholders, while further increasing the visibility of its professional achievements, teaching innovations, and lifelong learning activities. The Expert Panel also recommends continuing efforts aimed at the internationalization of the doctoral programme, particularly through enhancing doctoral student mobility and increasing the involvement of international supervisors and co-supervisors.
- Furthermore, the Faculty is encouraged to continue promoting the principles of Open Science and open access to research results.

Quality grade

The assessment area is completely fulfilled.

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

I. Higher education institution management and quality assurance

1.1. The mission of a higher education institution guides the process of operational planning and the development of quality assurance processes.

Analysis

The mission of the Faculty is improvement of science and education through excellence in research, training of experts in various sectors, education of new generations of physics teachers and contribution to solving recent social, technological and scientific challenges. It clearly guides the process of operational planning, since the Faculty has been systematically improving its research and teaching capacities and human resources, as well as adjusting its organization to fulfil its mission. It also guides the development of the quality assurance system, since it is obvious that the Faculty has been upgrading the system by including various stakeholders relevant to the goals stated in the mission.

Recommendations

- Continue making adjustments necessary to deal with the decline of the number of students, caused mainly by depopulation and decrease of interest in the study programmes offered by the Faculty.

Quality grade

The standard is completely fulfilled.

1.2. The higher education institution defined the internal organizational structure and processes that are managed responsibly, efficiently and effectively, and the higher education institution's stakeholders are included in the decision-making processes.

Analysis

The Faculty is organized in departments as research units and chairs as teaching units, in a reasonable way. All units and the Faculty as a whole are managed efficiently, and all stakeholders are included in the process in an appropriate way. The only problem is insufficient administrative support, especially in project management.

Since the Faculty was originally established as a university department, i.e. a smaller organizational unit without full financial autonomy, it relied on the administrative support from the university level, and had only one administrative employee at the department level. The transition from a department to a faculty was not followed by an increase in administrative personnel, and that presents a challenge, which is becoming more evident with the increase of

externally funded research projects. The University offers administrative support in the project management, which proved to be sufficient in the project application procedures, but not in the monitoring and reporting phase, which is often difficult for the scientists, since it represents unnecessary additional burden. This is especially true for the financial aspects of the reporting, since scientists are usually not particularly skilful in, or prone to this kind of activities.

Recommendations

- Continue improving involvement of the external stakeholders, especially the alumni club.
- Explore the possibilities to hire additional administrative personnel, or to obtain more comprehensive assistance from the university level in the project management.

Quality grade

The standard is completely fulfilled.

1.3. The higher education institution collects, analyses and uses data relevant for the effective management of all activities, and publishes the information about its work.

Analysis

The Faculty collects all the relevant data and uses it in the organization of various activities. Also, all relevant data are published at the Faculty website. The collection of various data from the students is especially efficient, since the small number of students enables close, direct and often informal communication between the staff and the students. However, the data collected in an informal way in most cases cannot be used for official purposes, and sometimes more formal data collection is needed. Unfortunately, in that situation, a small number of students presents a serious challenge. On one hand, formal data collection through surveys has to be anonymous, which can be impossible with only one or two students enrolled in a particular study programme. On the other hand, the analysis of such data is mainly statistical, which requires a large number of sources of information, and that is clearly not the case.

To address this problem, the data is collected over a longer period of time (several years), before it gets analysed, and that is the only sensible approach.

Recommendations

- Continue the tradition of close informal communication with the students.
- Continue building the alumni club, and use it as another relevant information source.

Quality grade

The standard is completely fulfilled.

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

Analysis

The Panel has not identified any unethical behaviour, or any issues related to any of the higher education fundamental values (academic freedom and integrity, institutional autonomy, staff and student participation and the public responsibility for and of higher education). The autonomy of the Faculty is not complete, but that is normal for an organizational unit within a university, which is not a legal entity. The Panel did not find any indications of any intolerance or discrimination.

Recommendations

- Continue the existing good practice in this area.

Quality grade

The standard is completely fulfilled.

1.5. The quality assurance system is periodically improved and revised on the basis of the results of implementation of regular internal and external quality assurance procedures.

Analysis

This is the first reaccreditation of the Faculty of Physics after it has been transformed from department into a faculty (in 2022), but it has been reaccredited twice as the Department of Physics, first time in 2015, and second time in 2021. In addition to that, there have been internal evaluations at the university level, as preparations to these external evaluations. The Faculty has taken into account findings of all these procedures, and followed the recommendations, not just to improve its quality assurance system, but more importantly, to improve its management structures and procedures, its teaching activities, and especially the quality of its research.

The Panel could see clear evidence for a number of improvements based on the report from the 2021 reaccreditation procedure. For example, the weakness identified regarding the management and quality assurance area was in the insufficient use of the alumni in the data collection, and the Panel could see the improvement in this area.

Recommendations

- Continue the existing good practice in this area.

Quality grade

The standard is completely fulfilled.

II. Study programmes and lifelong learning programmes

2.1. The intended learning outcomes at the level of a study programme are aligned with the competences a student should gain by completing the study programme, as well as with the CroQF level (ESG 1.2.).

Analysis

The Panel found that the intended learning outcomes are clearly defined and documented for the study programmes. They are aligned with the Faculty's mission, which combines research excellence, training experts for different sectors, educating future physics teachers, and contributing to contemporary scientific, technological and social challenges.

The learning outcomes cover both profession-specific and transferable competences. They include physics knowledge, mathematical and theoretical foundations, laboratory work, experimental methods, programming, data analysis, scientific writing and presentation, teacher-education competences, and specialised research areas. The Panel found that these competences correspond to the expected level and profile of the qualifications.

Based on the documentation and discussions during the site visit, the Panel found that the programme structure generally supports the achievement of these competences. Students and alumni described the programmes as demanding but coherent. Alumni gave especially positive feedback on their preparation for research and doctoral study. Project leaders and supervisors also confirmed that students from the Faculty can enter research work and contribute meaningfully.

The Faculty gives students opportunities to work with real data, real measurements, research methods and project-related tasks before thesis work. This is visible through laboratory courses, practicums, projects and early involvement in research. The Panel considers this a strong point because it directly connects study programmes with the Faculty's research mission.

At the same time, discussions during the site visit indicated mixed evidence on some transferable and technical skills. Mathematical and theoretical preparation was generally described as good. Programming, data analysis and computational skills are included in the programmes, and the Panel recognises that progress has been made in this respect. However, some staff and assistants indicated that these skills could be developed with greater continuity and depth, especially before students enter research projects or thesis work. The evidence was mixed, as some staff considered students well prepared in these areas, while others identified gaps. The Panel therefore considers this an area for further improvement rather than a major weakness.

Based on the documentation and site-visit discussions, the Panel considers the study programme outcomes broadly comparable with similar physics programmes in Croatia and the European higher education area, while recognising the specific profile of the Faculty and its small size. The Panel did not identify evidence that any study programme is misaligned with the relevant CroQF/EQF level. The programmes prepare students for further study, doctoral work, research, teaching, laboratory work and other professional contexts.

Recommendations

- Continue strengthening programming, data analysis and computational skills with greater continuity and depth, taking into account both research needs and modern expectations in industry and other career paths.
- Review whether the use of different programming languages in different parts of the programme is sufficiently coordinated and useful for students.

Quality grade

The standard is completely fulfilled.

2.2. The higher education institution determined the processes for planning and developing new study programmes, and for monitoring and periodically revising the existing ones. This ensures that the study programme is up-to-date, and that the content of study programmes is aligned with the latest scientific / artistic / professional knowledge (ESG 1.2. and ESG 1.9.).

Analysis

The Panel found that the Faculty has established processes for developing, monitoring and revising study programmes. Programme changes are discussed through Faculty bodies and internal quality assurance procedures. Student surveys, meetings with students, meeting minutes, informal feedback and enrolment data are used in monitoring the study programmes.

The content of the programmes is connected with the Faculty's research areas. Students encounter research topics through courses, seminars, thesis topics, laboratory work and projects. Discussions with teachers and project leaders confirmed that students may become involved in research before the final thesis stage. This helps keep the programmes up to date and connected with current scientific work.

The site visit provided examples of programme review and adjustment. Discussions during the site visit indicated that the Faculty is considering changes to the programme structure, including the balance between modules, mandatory courses and elective courses. The Faculty has also closed or suspended at least one low-enrolment programme element after internal discussion (a module). Programmes with no enrolment are being discussed, although in some cases decisions also depend on partner faculties.

The Panel found that the Faculty has continued the positive practice already recognised in the previous reaccreditation report, namely regular monitoring and improvement of study programmes through documentation, student feedback and internal discussion. At the same time, some issues identified in the previous report remain relevant, especially low enrolment in some programmes, heavy teaching workload, and the need to strengthen computing and transferable skills.

Discussions during the site visit indicated that formal changes to study programmes and course content are administratively demanding. Teachers therefore use the flexibility available within existing course descriptions, while larger changes require more complex procedures. This is

understandable, but it also creates a risk that some improvements may remain informal and not fully visible in formal programme review.

Based on discussions with students and teachers, the Panel found that ECTS credits generally correspond to actual student workload.

The programme structure supports vertical mobility from undergraduate to graduate and doctoral study. Horizontal and international mobility are supported through the ECTS-based structure, Erasmus/YUFE activities and recognition procedures. The previous reaccreditation report also found that students were informed about mobility opportunities, that support was provided through the Erasmus coordinator, and that acquired ECTS credits and grades were entered into the system after return. During the present site visit, students and staff confirmed that mobility support exists, but also identified practical difficulties in finding equivalent courses and recognising grades or ECTS credits from abroad, especially because of differences between specialised STEM curricula. The Faculty is aware of this issue and has discussed ways to address it.

The most important strategic issue under this standard is programme sustainability. Several graduate programmes have very low or no enrolment. The Faculty is aware of the problem and is active in outreach, school activities and science popularisation, but a clearer long-term decision on the programme portfolio is needed.

Recommendations

- Develop a clear and evidence-based programme sustainability plan for low-enrolment and no-enrolment programmes.
- Strengthen documentation of how feedback from students, alumni, employers, external partners and practice mentors is used in programme revision.
- Continue internationalisation efforts, including the use of English at master's level where appropriate, and ensure that mobility feedback is collected and used more systematically.
- Document smaller course-level improvements and connect them to periodic programme review, especially where formal programme changes are difficult.

Quality grade

The standard is completely fulfilled.

2.3. Student practice is an integral part of study programmes, where applicable.

Analysis

The Panel found that student practice is integrated where applicable and that the Faculty has made progress compared with the previous reaccreditation period. In the previous report, professional practice was recognised as formally established but still at an early stage of implementation. During the present site visit, the Panel found that practice is now more clearly embedded in the relevant programmes.

The Faculty has cooperation agreements with eight organisations, and students may also propose suitable placements themselves. Practice is coordinated by the Faculty and evaluated through student reports and feedback from external mentors or supervisors. This gives the Faculty a

mechanism to check whether the placement was useful and whether the expected competences were achieved.

In the teacher-education programmes, students have subject-specific physics courses, physics teaching methodology, demonstration and laboratory experiments for physics teacher training, and teaching practice in physics. Pedagogical, psychological and didactic components are delivered in cooperation with the relevant University constituent. The Panel considers that this structure supports both physics knowledge and teaching competences.

In other programmes, students gain practical experience through laboratory work, practicums, projects, thesis work, and work with real data and measurements. Students also have access to research facilities and may participate in research activities before the thesis stage. This is important because it gives students practical experience not only through formal placements, but also through research-related work at the Faculty. External stakeholders generally gave positive feedback on students' competences.

The Panel also received external stakeholder feedback concerning graduates who enter the teacher professional examination after completing their studies and subsequent school practice. The stakeholder expressed concern about candidates' performance in the physics part of the examination and stated that this issue is not specific only to graduates of this Faculty. The issue was also discussed with the Faculty management. The professional examination takes place after graduation and after a period of practice in schools, and is therefore not fully within the direct control of the Faculty. The Panel therefore treats this as a point for monitoring and further discussion with relevant stakeholders, not as evidence of a confirmed weakness in student practice or in the teacher-education programmes.

Recommendations

- Document more clearly how feedback from external mentors and partner organisations is used in programme improvement.
- Follow up, together with relevant external stakeholders, on the feedback concerning the teacher professional examination, and check whether any part of the Faculty's preparation of future physics teachers could be further improved.

Quality grade

The standard is completely fulfilled.

2.4. Quality assurance of lifelong learning programs is part of the internal quality assurance system of the higher education institution. This ensures that study programmes are relevant and up to date and that they meet the current social needs.

Analysis

The Faculty has lifelong learning activities connected with its mission and expertise. The Self-Evaluation Report lists four lifelong learning programmes or activities: the programme for the acquisition of missing knowledge, skills and competences required for enrolment in the Graduate University Study Programme in Engineering and Physics of Materials; the Specialised

Programme in Natural Sciences and Mathematics for Primary School Teachers; the micro-credential Recognition of Environmental Changes and Risk Management; and Advanced Laboratory Testing of Materials.

During the site visit, it was clarified that only one lifelong learning activity is currently active in practice - Advanced Laboratory Testing of Materials. This activity is related to presenting the Faculty's laboratory techniques and services to potential external users, including industry and other faculties. The Panel considers this relevant, as it is linked to the Faculty's equipment, expertise and professional services.

Compared with the previous reaccreditation, limited demand for some lifelong learning activities remains an issue. The previous report already noted that the lifelong learning programmes were well designed but did not seem to attract much interest, with very low application rates. During the present site visit, the Panel again found evidence of limited demand, in particular for the programme intended for teachers, which did not run because the number of interested participants was below the required minimum.

The Panel therefore considers lifelong learning to be present and relevant, but still not fully developed in terms of reach, demand and documented quality assurance. The Faculty should focus its lifelong learning offer on activities where there is clear external demand and where its expertise and facilities provide clear added value. It should also document more clearly how participant and stakeholder feedback is collected and used for improvement.

Recommendations

- Focus lifelong learning activities on areas where there is clear external demand and where the Faculty's expertise, facilities and professional services provide clear added value.
- Continue promoting the existing lifelong learning offer to relevant groups, including schools, industry, other faculties and potential users of the Faculty's laboratories and expertise.
- Document more clearly how participant feedback and stakeholder feedback are collected and used to improve lifelong learning activities.

Quality grade

Satisfactory fulfilment of the standard

III. Student-centred learning and teaching – the teaching process and student support

3.1. Learning and teaching are student-centred and ensure that all the intended learning outcomes are achieved.

Analysis

Students reported a highly supportive and student-centred learning environment. Communication with professors was described as open and approachable, enabling students to seek academic guidance and assistance whenever needed. The institution is able to provide an

individualised approach and personalised support throughout the study process. Students confirmed that they are actively involved in teaching and learning activities and that professors encourage participation, critical thinking and independent work.

Various forms of teaching delivery are used, including practical laboratory work, project-based assignments and research activities. Students also have opportunities to engage in research and project activities beyond regular coursework, and teaching staff actively encourage such involvement. Students stated that laboratory facilities are well equipped and support the achievement of intended learning outcomes. The institution actively uses digital learning platforms, particularly Merlin, which students use regularly for communication, access to course materials and organisation of teaching activities. Students also reported having access to mentors and programme coordinators who provide academic support and guidance throughout their studies.

Students highlighted that the relatively small number of students enables close interaction with professors and facilitates an individualised approach to teaching and learning. They reported that professors are accessible outside formal teaching hours and are willing to provide additional explanations and support when needed. Students also emphasised that they are regularly consulted regarding teaching-related matters and that their feedback is generally taken into consideration when discussing potential improvements. Students felt that their opinions are generally considered and that communication channels allow them to raise concerns and receive feedback in a timely manner. Students are represented in institutional bodies through elected student representatives who participate in discussions related to teaching and student matters and communicate student perspectives to the institution.

The organisation of teaching was assessed positively, and students indicated that the workload is generally manageable. They reported that laboratory exercises, project assignments and research-related activities contribute to the development of practical competences and support the achievement of intended learning outcomes.

Recommendations

- The institution should continue strengthening cooperation with alumni and create more opportunities for students to interact with graduates in order to gain insights into professional development and career pathways.

Quality grade

The standard is completely fulfilled.

3.2. The assessment and evaluation are objective and consistent, and they ensure that all the intended learning outcomes are achieved.

Analysis

Students expressed a high level of satisfaction with assessment procedures and reported that grading is fair, transparent and consistently applied across courses. Assessment criteria are clearly communicated, and students are informed about course requirements and evaluation

methods at the beginning of courses. Students reported that professors provide feedback and are willing to discuss assessment outcomes when needed.

Assessment methods are aligned with course requirements and learning outcomes. Students indicated that the combination of written examinations, laboratory work, project assignments and seminar presentations provides adequate opportunities to demonstrate the knowledge and competences acquired during the study programme. They considered the assessment methods appropriate for evaluating the achievement of intended learning outcomes.

No significant concerns regarding objectivity, consistency or fairness of assessment procedures were identified during the meeting. Students were aware of the available procedures for raising concerns related to assessment and reported confidence in the fairness of the assessment process. The institution demonstrates a supportive approach towards students experiencing academic difficulties. Students indicated that professors, mentors and coordinators monitor student progress and provide assistance when difficulties arise. Special attention is given to students with physical or mental health challenges, and individual accommodations are provided whenever necessary. Support is available throughout the academic year, and professors and coordinators actively monitor student performance and intervene when difficulties are identified.

Recommendations

- The institution should continue encouraging student participation in course evaluation surveys and explore mechanisms that would further increase student confidence in the anonymity of feedback processes, particularly considering the small number of student population.

Quality grade

The standard is completely fulfilled.

3.3. The requirements for student enrolment and progress, recognition and certification are clear, publicly available, and consistently applied.

Analysis

Students confirmed that information regarding enrolment procedures, study requirements and progression rules is readily available and clearly communicated. Relevant information is regularly disseminated through institutional communication channels and the Merlin platform. Programme coordinators and administrative staff are accessible and provide timely assistance regarding study regulations and progression requirements. Communication regarding academic obligations and administrative procedures was described as clear and effective. The institution monitors student progress and provides support mechanisms aimed at facilitating successful study completion. Students highlighted the availability of mentors and coordinators who assist them throughout their studies.

Information obtained during the site visit indicated that admission procedures are transparent and consistently applied. The institution actively promotes its study programmes through open days, visits to primary and secondary schools, educational fairs and activities aimed at

prospective students. Admission requirements ensure that prospective students possess the necessary prior knowledge and competencies required for successful participation in study programmes. Procedures related to the recognition of prior learning, study periods and ECTS credits are clearly defined and implemented in accordance with relevant regulations. Support is available throughout these processes, and the requirements for study completion and graduation are clearly communicated. Students are informed about the documentation issued upon successful completion of their studies.

Recommendations

- The institution should continue monitoring student progression and further strengthen activities aimed at informing students about available academic and professional development opportunities throughout their studies.

Quality grade

The standard is completely fulfilled.

3.4. The higher education institution provides sufficient and easily accessible resources to support students.

Analysis

Students reported that a wide range of support mechanisms is available and easily accessible. Academic support is provided through professors, mentors, programme coordinators and administrative services. Students stated that communication with institutional staff is efficient and that issues are generally resolved promptly. Particularly positive feedback was received regarding the institution's support for students with disabilities, health-related difficulties or other individual circumstances. Laboratory facilities were described as well-equipped and suitable for achieving intended learning outcomes. Students also confirmed that they have access to digital resources and regularly use institutional online platforms.

Information obtained during the site visit indicated that students are informed about the availability of counselling and advisory services provided both at the institutional and university level. Students are able to access academic, psychological and career-related support whenever needed. The institution also provides an environment that supports the development of digital competencies through the use of digital learning platforms and resources integrated into the teaching process.

Recommendations

- The institution should continue updating library resources and ensuring access to current literature. Consideration should also be given to providing additional space for informal student interaction and community-building activities. Furthermore, the institution should explore possibilities for increasing financial support for student participation in scientific conferences and professional events, particularly when students contribute to research projects.

Quality grade

The standard is completely fulfilled.

3.5. The higher education institution provides favourable conditions and support for students entering international outgoing and incoming mobility programmes.

Analysis

Students confirmed that information regarding international mobility opportunities is regularly communicated through institutional channels and the Merlin platform. Students highlighted the availability and accessibility of Erasmus coordinators who provide support and guidance throughout all stages of the mobility process, including applications, learning agreements and recognition procedures. Students expressed satisfaction with the support provided and indicated that Erasmus coordinators are approachable and readily available when assistance is needed. The institution actively encourages student participation in mobility programmes and provides students with relevant information regarding available opportunities. Students confirmed that support is available before, during and after the mobility period. Nevertheless, students identified certain challenges related to outgoing mobility. Due to the specific nature of STEM study programmes, finding equivalent courses and achieving full recognition of ECTS credits obtained abroad can be difficult. As a consequence, participation in mobility programmes may occasionally prolong the duration of studies. Students noted that these challenges primarily arise from differences in curricula and semester structures rather than from insufficient institutional support. Despite these challenges, students acknowledged that Erasmus coordinators provide continuous support and assist students in resolving issues related to course selection, recognition procedures and mobility administration. No significant concerns were raised regarding the institution's commitment to supporting student mobility. Furthermore, teaching and academic communication can be conducted in English, which supports the integration and successful participation of incoming international students.

Recommendations

- The institution should continue strengthening support mechanisms for outgoing mobility students and further explore opportunities to facilitate course recognition and ECTS transfer in order to minimise potential delays in study completion.

Quality grade

Satisfactory fulfilment of the standard

IV. Teaching capacities and infrastructure of the higher education institution

4.1. The higher education institution ensures adequate teaching capacities.

Analysis

A total of 24 teachers are employed full-time at the Faculty, including 22 in scientific-teaching positions and two in teaching positions, with additional support from six assistants and senior assistants. Among the full-time teaching staff, 18 are elected in the scientific field of Physics. The minimum number of teachers elected in the field in which the study programmes are delivered is fully met. Teachers from other constituent units of the University of Rijeka also participate in delivering the study programmes, including the Faculty of Mathematics and the Faculty of

Informatics and Digital Technologies. In the teacher-education study programmes Physics and Mathematics and Physics and Computer Science, eight courses of the teacher-education module are delivered at the Faculty of Humanities and Social Sciences in Rijeka. In the category of external collaborators, only those teachers engaged from outside the University of Rijeka system or outside established interinstitutional cooperation frameworks were recorded. Taking all of this into account, coverage of each study programme with the Faculty's own staff is within the required standards.

The ratio of students to full-time teachers at the Faculty is below 30:1, which supports a very high quality of study. The self-evaluation documents also show that all teachers and external associates are qualified to teach the courses they deliver and have relevant work experience. In addition, the total annual teaching load of all teachers does not exceed 20% of the total annual teaching load, in line with the requirements for public higher education institutions.

Recommendations

- The main recommendation in this area is to reduce the teaching workload, as it negatively affects staff members' scientific activities and mobility. This is not easy to achieve, since the ability to hire additional staff is significantly limited by laws and regulations. One possible way to reduce the teaching workload would be to decrease the number of study programmes. The student-to-full-time-teacher ratio at the Faculty is satisfactory, but it is still relatively low. The Faculty management should make additional efforts to attract more students.

Quality grade

The standard is completely fulfilled.

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

Analysis

The criteria for the appointment of teachers, researchers, and associates to vacant positions, as well as for promotion to higher positions or reappointment to existing positions, are conducted based on professional, objective and transparent procedure and criteria which promote excellence and are consistently applied. When selecting candidates, excellence criteria are taken into account, with particular attention paid to the candidate's record in scientific and teaching work. The Staff Employment and Promotion Plan is regularly updated in accordance with the needs of the study programmes, scientific priorities, and university and legal regulations. Promotion of teachers to higher grades is in line with the prescribed national minimum criteria and follows a formal procedure that takes into account the candidate's significant achievements. Key indicators include published scientific and professional papers, participation in research projects, supervision of undergraduate and graduate theses, international contributions to the discipline, publications in prestigious journals, authorship of textbooks, and participation in science popularization activities. In addition, student feedback collected through student surveys, as well as confirmations of conducted institutional evaluations of teaching quality, are also taken

into consideration. The Faculty does not have specifically prescribed competitive criteria for selecting excellent candidates, and excellence is assessed on a case-by-case basis.

Recommendations

- To ensure a high level of excellence among future staff, the Faculty could consider prescribing additional competitive criteria beyond the national minimum requirements, as these criteria would better reflect the strategic goals of the institution. To encourage project activity, greater emphasis could also be placed on candidates' successful projects in the promotion procedure.

Quality grade

The standard is completely fulfilled.

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

Analysis

The Faculty supports the continuous professional development of teaching staff in teaching competences. All teaching staff are encouraged to participate in workshops, courses, and other forms of training. Faculty teachers also take part in physics seminars featuring guest lecturers who present the latest scientific and professional developments, as well as in projects that directly link research and teaching activities. In addition, they have the opportunity to participate in organized professional development programmes aimed at improving teaching competences, including the lifelong learning programme Teaching Competences for Higher Education, organized by the Faculty of Humanities and Social Sciences of the University of Rijeka, which covers key areas of learning and teaching in higher education.

The Faculty implements a procedure for selecting candidates for the Teaching Excellence Award at the University of Rijeka level. The purpose of this award is to encourage high-quality teaching and to recognize teachers who have contributed to improving the quality of study through their work with students. The Faculty also rewards authors for publishing scientific papers in prestigious international journals, thereby promoting and recognizing the scientific productivity of teaching staff.

The Faculty encourages and supports the development of digital skills among teaching staff, recognizing digital transformation as a key component of contemporary education. It also promotes the improvement of teaching competences based on collected and analysed feedback on the effectiveness and efficiency of teaching performance. For this purpose, several evaluation methods are used: student surveys, teacher self-evaluation, peer review of teaching, and other forms of interaction with students and staff. Regular student surveys conducted for all courses provide teaching staff with feedback on how potential changes in teaching methods affect student satisfaction and performance, thereby ensuring the continuous improvement of teaching practice. The Faculty of Physics actively encourages the participation of teaching staff in international mobility programmes through national and international scientific projects, as well as through projects aimed at mobility and networking, such as Erasmus, COST, and bilateral projects. The

level of scientific and professional mobility among staff is quite good, while the level of teaching mobility is relatively low. So far, no requests for sabbatical leave have been submitted.

Recommendations

- Due to the significant teaching workload, teachers find it difficult to take a study leave. The Faculty's management should consider additional measures to encourage and facilitate sabbaticals and other mobility opportunities, as already suggested by the Panel members.

Quality grade

Satisfactory fulfilment of the standard

4.4. The premises, equipment and the complete infrastructure is suitable for teaching, scientific/artistic and professional activities.

Analysis

The Faculty has 6 lecture halls (358.85 m²), 18 laboratories and practical classrooms (770.45 m²), 4 workshops (38.95 m²), and one additional space used for teaching activities (53.38 m²). The total space used for teaching amounts to 1,221.63 m². The Faculty laboratories are equipped with research and educational equipment ranging from instructional instruments to major research infrastructure, thereby supporting teaching activities, scientific research, and professional work. All lecture halls are equipped with appropriate presentation equipment, including a computer, projector, and screen, as well as internet access. The Faculty also has a computer classroom equipped with student computers for computer-assisted teaching and independent student work.

Teaching staff have access to 23 offices (371.75 m²), while the Faculty's professional services are located in 6 offices (106.85 m²). Student spaces include areas for studying, project work, student associations, the student council, and related activities. The Faculty has also provided a number of laptop computers for students from lower socioeconomic backgrounds. Students additionally have access to reading room facilities operating as a branch of the University Library, with access to scientific and professional literature as well as user computers. Furthermore, equipment used in scientific laboratories for research is also available to students.

The Faculty provides more than 11 m² of space per student, which significantly exceeds the minimum requirement prescribed by the standard. The space, equipment, and overall infrastructure of the Faculty are appropriate for the implementation of all study programmes and ensure the achievement of the intended learning outcomes. The Faculty premises are accessible to persons with disabilities and meet all basic hygiene and health requirements, including natural lighting, ventilation, access to running water, and adequate heating and cooling.

Recommendations

- The management should allocate additional space for the student office, as the storage room currently being used most likely does not meet their entire needs.

Quality grade

The standard is completely fulfilled.

4.5. The library and library equipment, including access to additional resources, ensure the availability of literature and other resources necessary for a high-quality of study and scientific-teaching/artistic-teaching activities.

Analysis

The Library is located in the Campus Branch of the University Departments building and is specially equipped to meet the needs of students, teaching staff, and non-teaching personnel. It features modern equipment, information and communication infrastructure, and 44 workstations. Users have access to wired and wireless internet via the Eduroam system, seven desktop computers for academic work, and a multifunction device for printing, photocopying, and free self-service scanning for academic purposes.

The Library provides access to teaching, scientific, and professional materials. Scientific journals and bibliographic resources are available in both printed and electronic formats, including titles covered by national-level subscriptions that ensure broad access to current scholarly and professional literature in electronic form. Library materials are selected in cooperation with teaching staff and are continuously renewed through purchases funded by the Library's own projects or donations. This approach ensures the timely availability of teaching materials for all levels of study, as well as specialized literature needed for scientific and professional work. Teaching staff may submit requests for new titles, and acquisition proposals may also be made by staff and students through an online form available on the Library's website.

Recommendations

- The library meets the conditions for high-quality study, but the staff should make additional efforts to provide literature for study programmes with a small number of students.

Quality grade

The standard is completely fulfilled.

4.6. The higher education institution provides the necessary financial resources to conduct teaching, scientific and professional activities.

Analysis

The Faculty has maintained a positive financial balance since 2018, when numerous rationalization and cost-saving measures were introduced, also enabling the complete elimination

of debt from previous years. Financial resources are managed transparently through clearly defined procedures for planning, monitoring, and reporting.

The Faculty prepares financial plans that include projected revenues and expenditures for the implementation of its higher education, scientific, and professional activities. As the Faculty does not have separate legal personality, its financial operations form an integral part of the consolidated financial operations of the University of Rijeka.

The Faculty generates additional funds through national and international projects, collaboration with the industry sector, and other forms of project-based funding. External funding sources contribute significantly to financial stability, and the encouragement of project applications over the past five years has resulted in a large number of successful competitive projects.

In optimizing teaching activities, the number of external collaborators has been reduced by transferring part of the teaching load to internal staff. Strategic activities in publishing scientific papers also ensure additional funding through programme agreements.

The number of physics students is declining at both undergraduate and graduate levels, which has a negative impact on finances; however, the Doctoral Study Programme of Physics has contributed to a partial increase in this source of income.

Each year, the Management Board submits annual financial reports to the Faculty Council, with detailed explanations of revenues and expenditures for each item in the report. The Faculty Council adopts the financial plans and financial reports, which are then approved by the University Senate. Each employee is familiar with the available resources, either as needed or upon request. The higher institution has provided evidence of sufficient funds to deliver the study programmes.

Recommendations

- To ensure long-term financial sustainability, project activity should remain stable so that existing scientific equipment can be properly maintained and upgraded when needed. Continued collaboration with the industry sector and the local community is strongly encouraged. The decline in the number of physics students is not only a challenge for financial sustainability but also a broader issue that is not specific to this institution.

Quality grade

The standard is completely fulfilled.

V. Research/ artistic and professional activity

5.1. The higher education institution is recognisable by scientific research and/or artistic achievements in all the scientific fields in which it conducts studies.

Analysis

The Faculty of Physics conducts scientific research activities in several clearly defined and internationally relevant research areas, including astrophysics and astroparticle physics, elementary particle physics, quantum and nonlinear optics, materials physics, medical physics, environmental physics, and physics education. Research activities are organized through

laboratories, departments and research groups that cooperate with national and international institutions and participate in competitive national and international projects.

The Faculty's scientific productivity is high. In the observed five-year period, 192 scientific papers were published, of which 126 were published in first-quartile (Q1) journals, while 21 papers were published in journals ranked among the top 10% in their field. The average citation rate of the papers and the achieved H-index indicate the visibility and relevance of the research within the international scientific community. Teachers and researchers actively participate in international collaborations and research infrastructures, including CERN, Fermilab, CTA, MAGIC and LSST, confirming the international recognition of individual research groups.

The Faculty has shown significant progress in project activities compared to the previous reaccreditation period. Almost all teachers and researchers are involved in scientific projects, and the increase in the number of projects in which the Faculty acts as the project coordinator is particularly evident. The project funding obtained during the observed period represents an important source of financing for research activities and contributes to the development of research infrastructure and human resources.

The Panel also positively evaluates the Faculty's intensive international cooperation, the participation of teachers in editorial boards of scientific journals, professional and scientific bodies, and the organization and co-organization of scientific conferences. The Faculty successfully involves internationally recognized external associates in teaching, supervision and doctoral study activities, thereby further strengthening the quality of the research environment.

Recommendations

- The Expert Panel recommends that the Faculty continue to strengthen its participation in internationally competitive projects and further develop strategic international research collaborations.
- The Faculty should continue investing in research infrastructure and providing support to research groups, particularly those with clear potential for international recognition and attracting competitive funding.
- It is further recommended that the Faculty additionally encourage the involvement of early-career researchers and doctoral students in international collaborations, project activities, and publishing in highly ranked scientific journals.

Quality grade

The standard is completely fulfilled.

5.2. The higher education institution is distinguished by its professional achievements in all fields in which the professional study programme is delivered.

Analysis

The Faculty of Physics does not offer professional study programmes; therefore, this standard is evaluated in the context of its professional contribution to the development of physics, physics education and STEM fields. The Faculty's professional activity is particularly visible through the

education of future physics teachers, cooperation with schools, professional training of teachers, development of educational materials, and science popularisation activities.

The Expert Panel observed that the Chair of Physics Education plays an important role in this segment, contributing to the improvement of physics teaching through projects, professional conferences, cooperation with educational institutions, and the development of teaching materials.

The Expert Panel considers that the Faculty makes a significant professional contribution to the community through continuous cooperation with the Education and Teacher Training Agency, schools, county professional councils of physics teachers, and other educational institutions. Faculty staff regularly participate in professional conferences, deliver invited lectures, and take part in the organization of professional conferences and training activities intended for physics teachers.

The Faculty's involvement in professional and development projects related to the improvement of study programmes, the digitalization of teaching, and the strengthening of STEM competences is positively evaluated. The Faculty also plays an important role in science popularisation through its work with pupils, teachers and the wider public, as well as through various public events and activities.

However, professional output measured by the number of professional papers is relatively modest and is largely concentrated in the field of physics education. This is partly due to the fact that the Faculty is primarily a research-oriented institution whose results are predominantly published in scientific journals. Participation in the editorial boards of professional and popular science journals has not been clearly demonstrated in the narrower sense, but mainly refers to the editing of popular science content and conference publications. Publishing activity exists through textbooks, collections of problems and teaching materials, but it has not been presented as a sufficiently systematic and continuous activity of the Faculty. Although such an orientation is understandable and appropriate for the field of physics, the Faculty could more systematically monitor and document the effects of its professional activities on the education system and the development of the profession.

The Expert Panel concludes that the Faculty achieves a satisfactory level of quality within this standard. Professional activity is present, useful and connected with the needs of the education system; however, its systematic organization, visibility and evaluation of impact should be further improved.

Recommendations

- The Expert Panel recommends that the Faculty more systematically monitor and evaluate the effects of its professional activities on the education system, as well as their contribution to the professional development of teachers and pupils' achievements.
- It is also recommended that the Faculty further increase the visibility of its professional results through the publication of professional papers, teaching materials and other forms of knowledge transfer made available to the wider professional community.

- The Faculty should continue to develop professional training programmes for physics teachers and strengthen cooperation with schools and relevant institutions, while further increasing the international visibility of its activities in the field of physics education.
- It is also recommended that the Faculty consider opportunities for stronger links between its professional activities, labour market needs and the development of STEM competences in the regional environment.

Quality grade

Satisfactory fulfilment of the standard

5.3. The higher education institution influences the economy and society in general through the scientific and/or artistic work of its teachers.

Analysis

The Expert Panel finds that the Faculty of Physics achieves significant societal impact through the dissemination of scientific results, the popularisation of science, cooperation with educational institutions, public institutions and other external stakeholders. The Faculty members are involved in activities aimed at the popularisation of physics through public lectures, workshops, science festivals and media appearances.

The Faculty maintains a well-developed network of cooperation with national and international partners from the scientific, educational and public sectors, and participates in projects that contribute to addressing socially relevant issues, particularly in the areas of the environment, education and climate change.

Faculty members participate in the work of national and international scientific and professional bodies, as well as in the management structures of international research collaborations. They are also involved in reviewing scientific papers and project proposals, which confirms their international visibility and scientific competence.

The Expert Panel concludes that the Faculty successfully connects its scientific activity with the needs of society and makes a visible contribution to the development of education, science and the wider community.

Recommendations

- Continue developing cooperation with the economy, the public sector and other external stakeholders.
- Monitor and evaluate more systematically the societal impact of the Faculty's scientific, professional and popularisation activities.

Quality grade

The standard is completely fulfilled

5.4. Doctoral studies of the higher education institutions are aligned with the higher education institution's strategic programme, state-of-the-art scientific/artistic achievements, or professional standards and internationally accepted standards of high-quality doctoral education, where applicable.

Analysis

The doctoral programme in Physics is aligned with the strategic objectives of the Faculty and represents an important element of its scientific and research activities. During the site visit, the Expert Panel observed that doctoral students are actively involved in the Faculty's research projects and international scientific collaborations, thereby ensuring that the doctoral programme is linked to the institution's scientific priorities and contemporary research trends. The international mobility of doctoral students and cooperation with reputable foreign institutions are particularly noteworthy.

The programme contributes to the development of the national scientific system by educating young researchers in areas of strategic importance for the development of physics and related disciplines. The topics of doctoral dissertations are aligned with the Faculty's research areas and directly arise from the scientific projects in which supervisors and research groups participate. Doctoral students achieve scientific results that are published in internationally recognised journals and participate in international conferences and professional training activities.

The Expert Panel considers that the doctoral programme follows contemporary scientific knowledge and professional standards and enables students to acquire the research, professional and transferable competences necessary for independent scientific work. The flexibility of the programme, the possibility of individualising the study process, and the involvement of external associates and co-supervisors further contribute to the quality of doctoral education.

Recommendations

- Continue to encourage the international mobility of doctoral students and the involvement of foreign co-supervisors.
- It is also recommended to continue monitoring the employability and scientific careers of doctoral graduates in order to evaluate the long-term impact of the study programme.

Quality grade

The standard is completely fulfilled.

5.5. The higher education institution applies the principles of open science in its activities, processes and acts.

Analysis

The Faculty of Physics applies the principles of open science in accordance with the policies and guidelines of the University of Rijeka. The Expert Panel finds that appropriate institutional mechanisms have been established to ensure open access to scientific publications, theses, educational materials and research data. Particular emphasis is placed on alignment with the

Open Science Policy of the University of Rijeka, as well as on the availability of appropriate guidelines and support for researchers and students.

The Faculty uses an institutional repository integrated into the national DABAR system, thereby ensuring the storage, visibility and availability of scientific and educational content. A significant number of items have been deposited in the repository, most of which are available in open access. The Expert Panel also positively assesses activities aimed at educating staff and students about the principles of open science, as well as encouraging the application of open access, open licences and internationally accepted standards for research data management.

The Expert Panel concludes that the Faculty systematically applies the principles of open science and that open access to the results of scientific and educational work is well integrated into its activities and processes.

Recommendations

- Continue to increase the share of content available in open access.

Quality grade

The standard is completely fulfilled.

FINAL RECOMMENDATION OF THE EXPERT PANEL MEMBERS ON THE OUTCOME OF THE CONDUCTED PROCEDURE:

- a. ☒ **ISSUE A LICENCE**
- b. ☐ **ISSUE A LETTER OF EXPECTATION**
- c. ☐ **DENY A LICENCE**

ANNEXES

1. Quality grade summary – tables

2. Site-visit Protocol

<i>Quality grade by assessment area</i>				
<i>Assessment area</i>	The standard is not fulfilled	Minimal fulfilment of the standard	Satisfactory fulfilment of the standard	The standard is completely fulfilled
<i>I. Higher education institution management and quality assurance</i>				X
<i>II. Study programmes and lifelong learning programmes</i>				X
<i>III. Student-centred learning and teaching – the teaching process and support</i>				X
<i>IV. Teaching capacities and infrastructure of the higher education institution</i>				X
<i>V. Research/ artistic and professional activity</i>				X

<i>Quality grade by standard</i>				
<i>I. Higher education institution management and quality assurance</i>	<i>The standard is not fulfilled</i>	<i>Minimal fulfilment of the standard</i>	<i>Satisfactory fulfilment of the standard</i>	<i>The standard is completely fulfilled</i>
1.1. The mission of a higher education institution guides the process of operational planning and the development of quality assurance processes.				X
1.2. The higher education institution defined the internal organizational structure and processes that are managed responsibly, efficiently and effectively, and the higher education institution's stakeholders are included in the decision-making processes.				X
1.3. The higher education institution collects, analyses and uses data relevant for the effective management of all activities, and publishes the information about its work.				X
1.4. The higher education institution supports ethics and transparency, academic integrity and freedom, and prevents all types of unethical behaviour, intolerance, and discrimination.				X
1.5. The quality assurance system is periodically improved and revised on the basis of the results of implementation of regular internal and external quality assurance procedures.				X

<i>Quality grade by standard</i>				
<i>II. Study programmes and lifelong learning programmes</i>	<i>The standard is not fulfilled</i>	<i>Minimal fulfilment of the standard</i>	<i>Satisfactory fulfilment of the standard</i>	<i>The standard is completely fulfilled</i>
2.1. The intended learning outcomes at the level of a study programme are aligned with the competences a student should gain by completing the study programme, as well as with the CroQF level (ESG 1.2.).				X
2.2. The higher education institution determined the processes for planning and developing new study programmes, and for monitoring and periodically revising the existing ones. This ensures that the study programme is up-to-date, and that the content of study programmes is aligned with the latest scientific / artistic / professional knowledge (ESG 1.2. and ESG 1.9.).				X
2.3. Student practice is an integral part of study programmes, where applicable.				X
2.4. Quality assurance of lifelong learning programs is part of the internal quality assurance system of the higher education institution. This ensures that study programmes are relevant and up to date and that they meet the current social needs.			X	

<i>Quality grade by standard</i>				
<i>III. Student-centred learning and teaching – the teaching process and student support</i>	<i>The standard is not fulfilled</i>	<i>Minimal fulfilment of the standard</i>	<i>Satisfactory fulfilment of the standard</i>	<i>The standard is completely fulfilled</i>
3.1. Learning and teaching are student-centred and ensure that all the intended learning outcomes are achieved.				X
3.2. The assessment and evaluation are objective and consistent, and they ensure that all the intended learning outcomes are achieved.				X
3.3. The requirements for student enrolment and progress, recognition and certification are clear, publicly available, and consistently applied.				X
3.4. The higher education institution provides sufficient and easily accessible resources to support students.				X
3.5. The higher education institution provides favourable conditions and support for students entering international outgoing and incoming mobility programmes.			X	

<i>Quality grade by standard</i>				
<i>IV. Teaching capacities and infrastructure of the higher education institution</i>	<i>The standard is not fulfilled</i>	<i>Minimal fulfilment of the standard</i>	<i>Satisfactory fulfilment of the standard</i>	<i>The standard is completely fulfilled</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 ensures support to teachers in their professional development.			X	
4.4. The premises, equipment and the complete infrastructure is suitable for teaching, scientific/artistic and professional activities.				X
4.5. The library and library equipment, including access to additional resources, ensure the availability of literature and other resources necessary for a high-quality of study and scientific-teaching/artistic-teaching activities.				X
4.6. The higher education institution provides the necessary financial resources to conduct teaching, scientific and professional activities.				X

<i>Quality grade by standard</i>				
<i>V. Research/ artistic and professional activity</i>	<i>The standard is not fulfilled</i>	<i>Minimal fulfilment of the standard</i>	<i>Satisfactory fulfilment of the standard</i>	<i>The standard is completely fulfilled</i>
5.1. The higher education institution is recognisable by scientific research and/or artistic achievements in all the scientific fields in which it conducts studies.				X
5.2. The higher education institution is distinguished by its professional achievements in all fields in which the professional study programme is delivered.			X	
5.3. The higher education institution influences the economy and society in general through the scientific and/or artistic work of its teachers.				X
5.4. Doctoral studies of the higher education institutions are aligned with the higher education institution's strategic programme, state-of-the-art scientific/artistic achievements, or professional standards and internationally accepted standards of high-quality doctoral education, where applicable.				X
5.5. The higher education institution applies the principles of open science in its activities, processes and acts.				X

SITE VISIT PROTOCOL

Prvi dan posjeta stručnog povjerenstva visokom učilištu/First day of Site-visit of Expert Panel members to HEI

	srijeda, 20. svibnja 2026.	Wednesday, 20th May 2026
09:00 – 09:15	<i>Interni sastanak stručnog povjerenstva (analiza dokumentacije)</i>	<i>Internal meeting of the Expert Panel members (document analysis)</i>
09:15 – 10:15	Sastanak s dekanicom, prodekanicom i Voditeljicom službe za pravno-kadrovske poslove	Meeting with the Dean, Vice-Dean and Head of the Legal and Human Resources Office
10:15 – 10:30	<i>Interni sastanak stručnog povjerenstva (analiza dokumentacije)</i>	<i>Internal meeting of the Expert Panel members (document analysis)</i>
10:30 – 11:30	Sastanak s članovima Povjerenstvom za izradu samoanalize i članovima Odbora za osiguravanje i unapređivanje kvalitete	Meeting with the members of the <i>Committee responsible for preparing the Self-Evaluation Report and Committee for Quality Assurance and Enhancement</i>
11:30 – 11:45	<i>Pauza</i>	<i>Break</i>
11:45 – 12:45	Sastanak sa studentima (<i>otvoreni sastanak za sve studente</i>)	Meeting with students (open meeting for all students)
12:45 – 13:30	Sastanak s alumnijima (<i>bivši studenti koji nisu zaposlenici Fakulteta</i>)	Meeting with alumni (former students who are not employed by the Faculty)
13:30 – 14:45	<i>Radni ručak</i>	<i>Working lunch</i>
14:45 – 15:30	Sastanak s vanjskim dionicima (nenastavnim) s kojima visoko učilište surađuje	Meeting with external stakeholders (non-teaching) with which the institution cooperates

15:30 – 16:00	Organizacija dodatnog sastanka o otvorenim pitanjima, prema potrebi	Organisation of an additional meeting on open questions, if needed
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Drugi dan posjeta stručnog povjerenstva visokom učilištu/ Second day of Site-visit of Expert Panel members to HEI

	četvrtak, 21. svibnja 2026.	Thursday, 21st May 2026
09:00 – 10:00	Sastanak s Prodekanicom fakulteta, voditeljicom smjera Fizika okoliša, te stručnom savjetnicom	Meeting with the Vice-Dean of the Faculty, Head of the Environmental Physics department, and expert advisor
10:00 – 11:00	Obilazak fakulteta (predavaonice, laboratoriji, zavodi, informatičke učionice, uredi studentskih službi, knjižnica)	Tour of the Faculty (classrooms, laboratories, departments, computer classrooms, student services, library)
11:00 – 12:00	Sastanak s nastavnicima u stalnom radnom odnosu, bez prisustva članova uprave	Meeting with full-time employed teachers, without the presence of management members
12:00 – 13:00	Sastanak s nastavnicima / voditeljima studijskih programa	Meeting with teachers / heads of study programmes
13:00 – 14:15	<i>Radni ručak</i>	<i>Working lunch</i>
14:15– 17:00	Opazanje nastave	Participation in teaching classes Tour of the Faculty (classrooms, laboratories, departments, computer classrooms, student services, library)

Treći dan posjeta stručnog povjerenstva visokom učilištu/ Third day of Site-visit of Expert Panel members to HEI

	petak, 22. svibnja 2026.	Friday, 22nd May 2026
09:00 – 09:15	<i>Interni sastanak stručnog povjerenstva (analiza dokumentacije)</i>	<i>Internal meeting of the Expert Panel members (document analysis)</i>
09:15 – 10:15	Sastanak s Prodekanom fakulteta, predstojnikom Zavoda za teorijsku fiziku i astrofiziku, ERASMUS I YUFE koordinatore	Meeting with Vice-Dean for Science, Head of the Institute for Theoretical Physics and Astrophysics, ERASMUS and YUFE coordinator
10:15 – 10:30	<i>Pauza</i>	<i>Break</i>
10:30 – 11:30	Sastanak s voditeljima znanstvenih i stručnih projekata	Meeting with the heads of research and professional projects
11:30 – 12:30	Sastanak s asistentima i višim asistentima	Meeting with assistants and senior assistants
12:30 – 13:30	<i>Radni ručak</i>	<i>Working lunch</i>
13:30 – 14:00	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions, if needed
14:00 – 14:30	<i>Priprema za završni sastanak s upravom</i>	<i>Preparation for Exit meeting with the Management</i>
14:30 – 14:45	Završni sastanak s dekanicom, prodekanicom i Voditeljicom službe za pravno-kadrovske poslove	Exit meeting with the Dean, vice-deans and Head of the Legal and Human Resources Office

SUMMARY

The Expert Panel formed a positive overall impression of the University of Rijeka, Faculty of Physics. The Faculty is a small but active academic community with committed staff, close communication with students, a strong research profile and good research facilities. The Panel found that the Faculty is well managed within the limitations of its organisational status within the University, especially regarding financial autonomy and hiring.

The Faculty's study programmes are coherent and broadly aligned with its mission. Teaching is strongly connected with research, and students have opportunities to become involved in research and project activities during their studies. Alumni, supervisors and project leaders gave positive feedback on students' preparation for research and doctoral study. The doctoral programme is one of the main strengths of the Faculty and is well connected with the Faculty's research areas and international collaborations.

Students reported a supportive and student-centred learning environment. Communication with teachers, mentors and coordinators is open and effective, and the small number of students allows for individualised support. Assessment procedures were described as fair and transparent, and students have access to academic, administrative and mobility support.

The Faculty also has a strong scientific profile, with good research productivity, active project participation and international collaboration. The Panel positively evaluates the Faculty's scientific visibility, doctoral education, outreach activities and application of open science principles. The Faculty contributes to society through science popularisation, cooperation with schools and educational institutions, and participation in socially relevant projects.

The main strategic concern is the sustainability of study programmes with very low or no enrolment. This issue is connected with teaching workload, limited staffing possibilities and the need to maintain a broad programme portfolio with small cohorts. The Panel recommends that the Faculty develop a clearer strategy for the programme portfolio, including possible restructuring, merging, suspension or closure of programmes or programme elements where needed.

The Panel also recommends continuing to strengthen programming, data analysis and computational skills in the curriculum, improving the visibility and use of alumni and stakeholder feedback, and focusing lifelong learning activities on areas where there is clear external demand and where the Faculty's expertise and facilities provide clear added value.

Teaching capacities and infrastructure are generally adequate and support the delivery of study programmes, research and professional activities. The Faculty has sufficient and qualified teaching staff and meets the relevant teaching-capacity requirements. The Panel positively notes the Faculty's modern laboratories, research equipment, teaching spaces, IT classroom and library resources, as well as the availability of research infrastructure to students. At the same time, the teaching workload is substantial and may limit scientific activity, staff mobility and the use of sabbaticals. Further attention should also be given to administrative support for project management, library literature for programmes with small numbers of students, and practical space needs such as the student office. Financial management appears stable and transparent, with project activity contributing to sustainability, although low enrolment remains relevant for the Faculty's long-term financial context.

On the basis of the evidence reviewed and the site visit, the Expert Panel recommends issuing a licence.