REPORT
OF THE EXPERT PANEL
ON THE
RE-ACCREDITATION OF
THE DEPARTMENT OF MATHEMATICS
OF THE J. J. STROSSMAYER UNIVERSITY OF OSIJEK

Date of on-line re-accreditation:
12, 15 and 16 April 2021

May 2021

CONTENT

INTRODUCTION

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

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

The Agency's Accreditation Council appointed an independent Expert Panel for the evaluation of the Department of Mathematics, J. J. Strossmayer University of Osijek.

Members of the Expert Panel:

1. Prof. Igor Pažanin, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Croatia
2. Prof. Petar Pavešić, Ph.D., University of Ljubljana, Faculty of Mathematics and Physics, Slovenia
3. Doc. dr. sc. Hrvoje Jerković, Visoko učilište Algebra, Croatia
4. Doc. dr.sc. Gordan Radobolja, Prirodoslovno-matematički fakultet Sveučilišta u Splitu, Croatia
5. Paula Vulić, student, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Croatia.

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

- Management of the J. J. Stossmayer University of Osijek and the Department of Mathematics
- Representatives of the Committee for the Preparation of the Self-Evaluation Report and the Office for Quality Enhancement and Assurance in Higher Education
- Heads of departments
- Full-time teachers
- students
- heads of research projects
- assistants and postdoctoral researchers

- heads of doctoral programmes and leaders of research projects
- Representatives of the Office for Students, and employees in jobs related to science, projects, international cooperation and lifelong learning
- alumni
- Representatives of the business sector, potential employers.

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

The Expert Panel drafted the Report on the re-accreditation of the Department of Mathematics, J. J. Strossmayer University of Osijek on the basis of the Self-evaluation of the Department of Mathematics of the J. J. Strossmayer University of Osijek, other relevant documents and on-line meetings.

The Report contains the following elements:

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

In the analysis of the documentation, on-line meetings and writing of the Report, the Expert Panel was supported by:

- Katarina Šimić Jagunić, coordinator, ASHE
- Emita Blagdan, assistant coordinator, ASHE
- Lida Lamza, Report translator, ASHE.

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

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

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

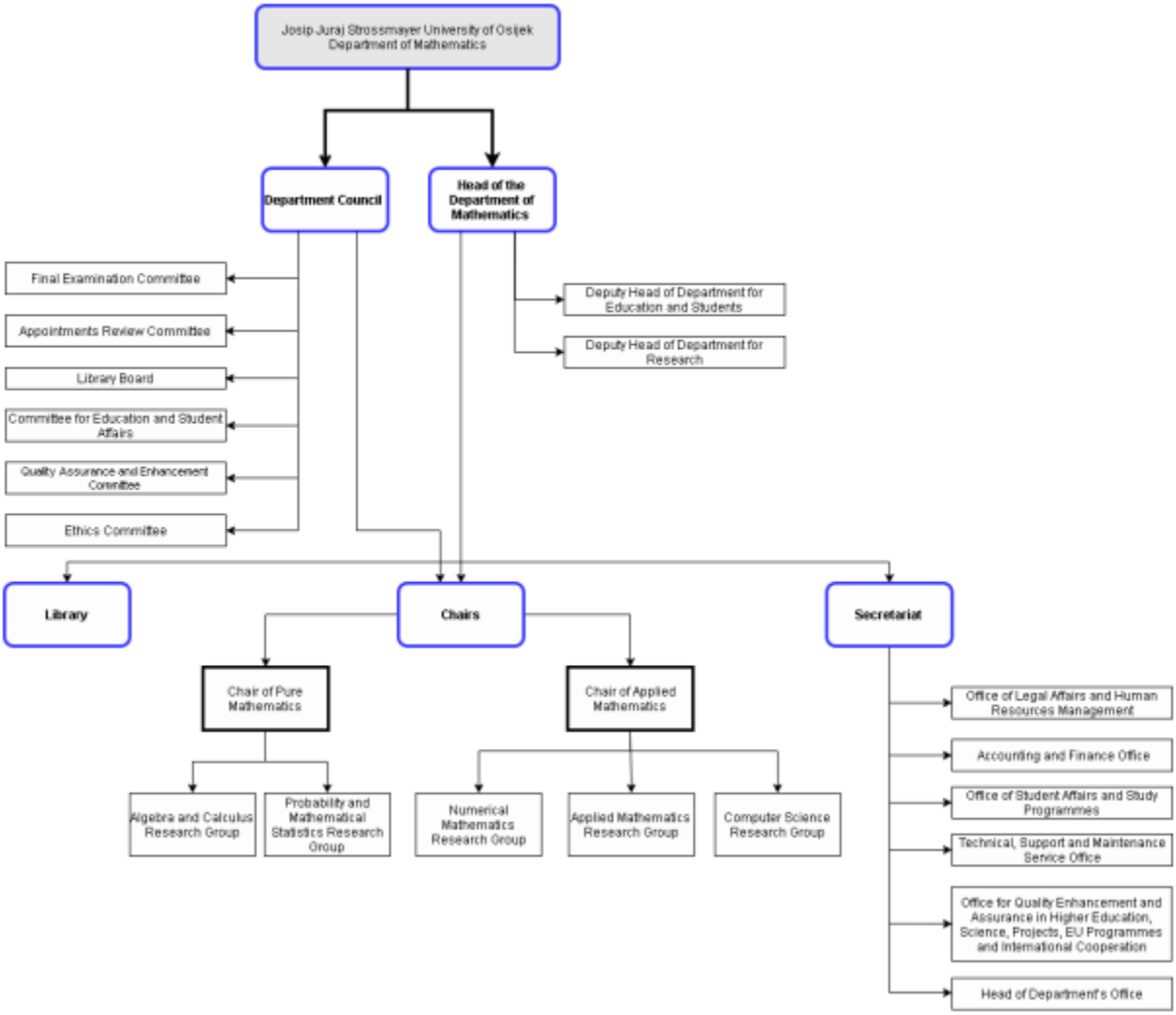
SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION

NAME OF HIGHER EDUCATION INSTITUTION: Department of Mathematics, University J. J. Strossmayer University of Osijek

ADDRESS: Trg Ljudevita Gaja 6, 31 000 Osijek

DEAN: prof. dr. sc. Kristian Sabo

ORGANISATIONAL STRUCTURE:



STUDY PROGRAMMES:

- Undergraduate university study programme in Mathematics
- Undergraduate university study programme in Mathematics and Computer Science
- Graduate university study programme in Mathematics and Informatics, specialisation: Teaching
- Graduate university study programme in Mathematics, specialisation: Financial Mathematics and Statistics
- Graduate university study programme in Mathematics, specialisation: Mathematics and Computer Science
- Graduate university study programme in Mathematics, specialisation: Industrial and Applied Mathematics (not delivered)

The Integrated undergraduate and graduate university study programme in Mathematics and Informatics, specialisation: Teaching, was delivered at the Department of Mathematics since 2004. As part of a revision of study programmes, this study programme was replaced by two new study programmes, i.e. the Undergraduate university study programme in Mathematics and Computer Science (delivered since 2017), and the Graduate university study programme in Mathematics and Informatics, specialisation: Teaching (delivered since 2020)).

As of the academic year 2017/2018, students cannot enrol in the integrated undergraduate and graduate university study programme. In the academic year 2020/2021, classes are held only for fifth-year (senior) students and this is also the last year that this study programme is delivered. For this reason, on the 9th July 2020, the Department Council passed the Decision proposing to the University Senate to delete the said study programme from the Register of Study Programmes run by the Ministry of Science and Education. Based on this proposal, on the 16th September 2020, the University Senate passed the Decision on deleting the Integrated undergraduate and graduate university study programme in Mathematics and Informatics, specialisation: Teaching, from the Register of Study Programmes, and forwarded this Decision to the Ministry of Science and Education on the 23rd September 2020 for further proceedings.

Based on the letter sent by the Head of Department on the 11th December 2020 to the Agency for Science and Higher Education, the Agency exempted the Integrated undergraduate and graduate university study programme in Mathematics and Informatics, specialisation: Teaching, from the re-accreditation process.

NUMBER OF STUDENTS: 492

NUMBER OF TEACHERS: 25.5

ENROLLMENT IN THE REGISTER OF SCIENTIFIC ORGANISATIONS:
Natural sciences

SHORT DESCRIPTION OF THE EVALUATED HIGHER EDUCATION INSTITUTION

- Department of Mathematics, University J. J. Strossmayer University of Osijek was founded on the 1st October 1999, as the first university department in the Republic of Croatia. It was organised along the lines of universities in Western Europe and the United States. The core of the future University Department formally began to be developed as early as 1993 when the Osijek Mathematical Society was founded at the Institute of Applied Mathematics, after which a regular Mathematical Colloquium was initiated, and finally, in 1996, the scientific journal Mathematical Communications was launched.
- Due to the exceptional efforts of the J. J. Strossmayer University in Osijek and the Ministry of Science and Education, on the 4th September 2001, the Department of Mathematics was given use of the premises in the former barracks *Gaj*. The first adaptation phase of a part of the barracks for the needs of the Department of Mathematics was completed in December 2001. Since then, the Department of Mathematics has been operating at its current location - Trg Ljudevita Gaja 6. The adaptation of the entire building was completed in late 2003. At that time, the Department of Mathematics was given appropriate premises which made it possible to optimise the organisation and implementation of classes as well as all the activities related to scientific research in the field of mathematics.
- The newly established Department of Mathematics took over two four-year university study programmes (pre-Bologna): Mathematics-Informatics and Mathematics-Physics that awarded professional titles *profesor matematike i informatike* (Teacher of Mathematics and Informatics), or *profesor matematike i fizike* (Teacher of Mathematics and Physics) from the then Faculty of Education, University of Osijek, and right away began to work on a new engineering study programme with several specializations. With the introduction of the Bologna process in the Republic of Croatia, this activity was redirected to the development of new study programmes in line with this process. Thus, the Department of Mathematics of the University of Osijek received one of the first licences for its new study programmes that were harmonized with the Bologna process.
- In addition to all the above activities, the Department of Mathematics is engaged in the organization of teaching mathematics and statistics at other faculties of the University of Osijek, and in organizing scientific-research and professional work in the field of mathematics at the University of Osijek. It should be emphasized that, after many years of conducting planned and organised activities, in the academic year 2009/2010 the

Department of Mathematics had enough human resources to independently carry out and perform mathematics classes on its study programmes.

BRIEF ANALYSIS OF THE INSTITUTIONAL ADVANTAGES AND DISADVANTAGES

ADVANTAGES OF THE INSTITUTION

1. High employability of graduates.
2. Appropriate infrastructure, premises and equipment.
3. Good opportunities for connection with the industry in the region.
4. Systematic involvement of students in research work.

DISADVANTAGES OF THE INSTITUTION

1. Relatively high teaching load and extensive external cooperation.
2. Lack of applications for competitive projects.
3. Internationalization of studies, relatively small number of incoming and outgoing students.
4. Mobility of teaching staff.
5. Lack of lifelong learning programmes.

LIST OF INSTITUTIONAL GOOD PRACTICES

EXAMPLES OF GOOD PRACTICE

1. Rich and quality publishing activity, extremely developed dissemination and organization of seminars.
2. Intensive cooperation with the IT sector.
3. Availability of information, excellent website.
4. Promotion of study programmes, visibility in the region.
5. Availability of teaching staff to students, good working atmosphere, internal surveys, and harmonization of ECTS credits based on the feedback from internal surveys.

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

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

Analysis:

The internal quality assurance system is largely functional. Representatives of employers and the alumni - especially those of teaching specialisations - need to be more significantly involved in the analysis and planning.

The Department has identified the problem of teacher overload, but has not offered any solutions. The Expert Panel thinks that any solution for this problem must necessarily include a more active involvement of the University management.

The introduction of internal surveys and awards for scientific contribution is commendable.

The Department has partially implemented suggestions for improvement from previous evaluations (introducing internal surveys, reducing the number of research groups and increasing the number of research projects). However, almost nothing has changed in reducing external cooperation.

The Department takes care to respect academic integrity and freedoms and to prevent unethical behaviour, intolerance and discrimination. The implementation of these principles at the Department is under the authority of the Ethics Committee, which includes a student representative. However, it is somewhat surprising that, in the last five years, no disciplinary proceedings have been initiated at the Department, nor any proceedings that would require the involvement of the Ethics Committee.

Information on the Department's activities is available through its website, which is clear and well-maintained. The website features promotional videos as well as all the editions published by the Department.

Department's activities for the popularization of its study programmes are at an enviable level.

In the previous period, the Department developed and formalized a strong cooperation with companies from the IT sector. The Department confirmed its commitment to this cooperation by launching a new undergraduate study programme in Mathematics and Computer Science, which demanded a huge effort invested by its teachers, especially those in computer sciences. The Department offers some lifelong learning programmes in the field of statistics and financial mathematics.

Recommendations for improvement:

The recommendation is to establish an Economic Council that would include the alumni and industry stakeholders.

Human resources policy must be conducted on a longer-term basis, which requires greater support from the University.
It is necessary to encourage researchers - especially younger ones - to apply for competitive projects, and teachers to go on longer study periods abroad and establish new collaborations. In this sense, the relationship with the University should be redefined in order to reduce external cooperation.
The Panel would suggest a more significant engagement of the Ethics Committee.
Given the growing number of "predatory" journals and conferences, the suggestion is to increase the involvement of mentors who could warn young researchers about these phenomena. The Panel proposes a gradual introduction of some activities intended for the promotion and popularization of study programmes and scientific work, such as holding an Open Door Day of the Department, establishing a Career Center, organizing a Career Day, etc. The Panel thinks that the Department needs to intensify their efforts to offer lifelong learning programmes, especially in the field of methodological courses for students who have completed non-teaching study programmes.

Quality grade: Satisfactory level of quality

II. Study programmes

Analysis:
During the reporting period, the Department made great efforts to modernize its study programmes. In accordance with its teaching capacities, it offers two undergraduate and three graduate studies. In addition to the classic undergraduate study of Mathematics, we would highlight the undergraduate and graduate study of Mathematics and Computer Science, which were designed in cooperation with the IT sector. The needs of the labour market for employees educated by the Department (computer science specialists, mathematics teachers, statisticians) far exceed the number of outgoing students, which is why the justification for all study programmes is not in question. Based on the information from the representatives of the labour market and the alumni, it is clear that the Department graduates possess the necessary expertise and that the planned learning outcomes are successfully achieved. Student internships at the study programmes of Mathematics and Computer Science and the Mathematics teacher training studies provide an excellent opportunity for students to get acquainted with their future work environment, and often represent the basis for the preparation of final and graduate theses.
It is commendable that the Department, through feedback received from internal student surveys, updates ECTS credits in accordance with the actual workload, and that it continuously works on "refreshing" study programmes through cooperation with the IT

sector, or gives postdoctoral students and junior assistant professors the opportunity to offer new courses from the field of their specialization.

Recommendations for improvement:
Due to the high teaching workload at other University constituents and the complexity of their programmes, the Department should increase its teaching staff, especially in the field of computer science.
Additional work is needed on interpreting student surveys and addressing the problems in the teaching process that are detected through them.
The Department should further formalize its cooperation with external stakeholders who have a continuous influence on study programmes.
It is recommended to conduct an analysis of the Department's capacity for introducing the option of studying while working.

Quality grade: High level of quality

III. Teaching process and student support

Analysis:
The criteria for enrolment or continuation of studies are clear, publicly announced and in accordance with the requirements of study programmes performed by the Department. A functional system has been established through which enrolments are regularly carried out in accordance with the stated criteria. It is commendable that the Department encourages the enrolment of highly motivated candidates through an additional evaluation of special achievements.
Although the process of recognizing prior learning is clearly defined, there are no publicly announced procedures and examples of their implementation for the purpose of informing students.
The Department regularly collects data on student progress, analyses it and, based on the results, partially initiates appropriate activities. In order to ensure the continuity and completion of studies, it is necessary to supplement the existing procedures by introducing additional measures.
The Department provides student-centred teaching at a satisfactory level of quality, encourages the development of students' competencies through the implementation of various forms of teaching, and regularly adjusts the way of teaching, taking into account student feedback.
The Department uses advanced technologies in teaching, but there is no consistency in their selection.

The Panel especially commends the great effort of teachers, or rather their availability and commitment.
The Department systematically provides support to students in terms of study counselling, psychological assistance and support to students with disabilities at the University level, and partly also support in terms of professional / career counselling.
Functional procedures have been put in place to support the inclusion in programmes of incoming and outgoing mobility. All established support procedures are available and, if necessary, adaptable to a diverse student population, and are carried out by qualified staff.
The Department pays attention to the needs of students from vulnerable and underrepresented groups and, if necessary, takes appropriate measures to provide assistance.
The Department is at a high level of readiness to provide different types of support to students, but the availability of such information for students is poor.
Although the process of providing support for programmes of incoming and outgoing mobility has been established, the Department should encourage such activities among its students much more, as well as work on its promotion among potential incoming foreign students. Students of the Department only partially acquire the competencies needed to work / study in an international environment.
Assessment and grading of student achievements meet the criteria of objectivity and consistency through a functional system of student surveys that allows the reporting of irregularities, and students regularly have insight into assessment results and, if necessary, available recommendations for improvement.
The assessment criteria and methods are clear and made public in a timely manner, with the exception of a timely list of exam dates.
The Department does not provide systematic support to teaching staff in developing skills related to testing and assessment methods.
The diploma and diploma supplement are issued in accordance with the relevant regulations. The employability of students after their studies is at a high level, which is the result of the shortage of the Department graduates, as well as the Department's good policy regarding the connection with the economy and compliance with social and labour market needs. The employability of graduates is regularly analysed through the number of employed alumni, but not enough attention is paid to the information where the students are employed.
Students are informed about opportunities for further education and/or employment, but there is a lack of a formal and functional way to support students in career planning and career guidance. Contact with the alumni and their involvement in the processes of programme improvement is occasional, i.e. there is no official alumni club.

Recommendations for improvement:

In order to ensure the continuity and completion of studies, the Department should improve the existing and introduce new measures. It is also necessary to establish an "early warning" system for poor study performance, which would operate on the basis of up-to-date and continuous collection of data on student achievements, and through which adequate assistance would be provided in a timely manner.
The Panel recommends establishing systematic connections between first-year and senior students, and enabling a reporting of problems, not only to someone from the ranks of teachers, but also through a student representative/mentor.
It is necessary to encourage more international mobility of students and the development of student competencies that are necessary for the international environment, especially the independence of students in learning a foreign (English) language and using foreign literature.
It is recommended to establish formal and functional ways to provide career guidance and career planning support (Career Center).
The Panel recommends encouraging consistency in the selection of a platform for sharing teaching materials and the introduction of an electronic way of recording grades. It is necessary to encourage the teaching staff to share experiences and successful methods in teaching as part of a formal event.
The Panel proposes the establishment of an official alumni club, and a greater involvement of its members in the work and process of improving the Department.
The Department should pay attention to the inconsistency of teaching methods with the criteria and methods for assessing student work, and take measures to prevent such cases.
It is necessary to better inform students about all the possibilities, i.e. ways and forms of support offered by the Department (financial support, the possibility of concluding contracts with foreign institutions that are not on the list, and which the student wants to visit for mobility, etc.).

Quality grade: Satisfactory level of quality

IV. Teaching and institutional capacities,

Analysis:
The ratio of teachers and students is favourable, and teaching at the Department is largely covered by its own staff. It is commendable that the teaching load that is part of the norm is assigned taking into account the involvement of individual teachers in research work.

There is significant engagement of teachers at other University constituents that exceeds the norm and greatly affects the time available to most teachers to engage in research activities. This is especially evident in younger teachers elected to associate grades.
Recruitment procedures and the implementation of appropriate elections to scientific-teaching, associate and teaching grades are carried out in accordance with positive legal regulations and internal acts. However, the fact that the coefficient released by teachers' retirement is not immediately and fully returned to the Department is worrying. Such practice by the University management has a negative impact on the possibility of longer-term planning of the Department's personnel policy, or rather the advancement of teachers that is based on excellence.
Funds received to support scientific research are divided by research groups, taking into account their past scientific work, which is motivating. The Ordinance on rewarding teachers and associates enables the awarding of exceptional candidates. Awards prescribed by this Ordinance should be bestowed regularly.
The mobility of teachers and associates is not at a satisfactory level; for instance, no teacher at the Department has exercised the right to a sabbatical for teaching obligations.
The infrastructure available to the Department is adequate and well maintained. In particular, library space and resources meet the needs of students and teachers and enable the implementation of quality scientific research.
Finally, the Department manages its financial resources transparently, efficiently and purposefully.

Recommendations for improvement:

The Expert Panel thinks that it is necessary to significantly reduce the teaching load of teachers (especially younger researchers) at other University constituents and, consequently, redefine the relationship between the Department and the University.
The Panel believes that by increasing its involvement in applying for projects of the Croatian Science Foundation, the Department could ensure new employments.
Furthermore, the Panel believes that additional engagement of experts from the IT sector in teaching would have a beneficial effect on relieving teachers who are in charge of computer science courses.
It is recommended that the Department prescribes additional criteria for excellence of scientific and teaching activities that would be taken into account during teacher advancement.
The practice of having to request the University's approval for coefficients released at the Department by the retirement of teachers needs to be changed so that the Department can make long-term plans regarding human resources.
The Panel recommends that the Department management strongly encourages the scientific development of teachers, especially young researchers. This primarily refers to longer study stays abroad, as well as to greater engagement in applying for competitive

scientific research projects. In this sense, teaching load of young researchers that exceeds the norm should be reduced, and the Department should prescribed formal criteria of excellence to be taken into account for teacher advancement.
Teachers in charge of computer science courses need to be provided with continuous professional development. The University management should consider reducing the percentage it retains from tuition fees, which would increase the Department's revenue. It is necessary to adopt an Ordinance on the distribution of own source revenues, which would, among other things, specify the percentage for professional projects' overhead.

Quality grade: Satisfactory level of quality

V. Scientific/artistic activity

Analysis:
The teachers' scientific productivity is at an acceptable level, while the productivity of assistants and postdoctoral students is quite low. Nevertheless, progress is visible when compared to the previous accreditation. The Department encourages scientific work by awarding various prizes and recognitions. Also, when it allocates funds for scientific research, part of the funds are distributed on the basis of publications in indexed journals. The Department has an excellently maintained and publicly available database of scientific and professional papers.
The Department is strategically oriented towards applied mathematics.
As an institution, the Department is a member or even co-founder of professional associations in the field of applied mathematics, and most employees are themselves members of these and other scientific associations.
The Department has participated in two projects of the transfer of knowledge to the economy and, given its focus, this type of activities should be intensified.
In the past period, the Department was the holder of three projects of the Croatian Science Foundation and some smaller projects. Given the size of the Department, this is a relatively low number that leaves a lot of room for improvement.
The greatest potential danger for the Department's further development is the very low mobility for longer periods of stay (more than three months). This is especially pronounced with younger associates, which is why this problem needs to be addressed as soon as possible.
The space and equipment available to the Department are used jointly for research and teaching purposes.
Students of all levels are involved in scientific research. It is commendable that, in the past five years, as many as 23 scientific and 30 professional papers have been published in co-authorship with students.

Recommendations for improvement:

It is necessary to further encourage scientific activity and professional independence of younger members of the Department, participation in conferences abroad and co-authorship with international experts.

It is necessary to significantly increase the number of scientific research topics related to the needs of the economy.

It is necessary to increase the number of applications for competitive research and development projects, with special encouragement for younger teachers and associates.

In order to make the Department recognizable and motivate it for further work, it is recommended that the Department intensifies the candidacies of prominent scientists and younger promising employees for appropriate awards and recognitions.

Additional efforts are needed to address the problem of longer mobility of all Department teachers and associates, especially younger ones. It is necessary to reduce the average teaching load.

The Department and the University as a whole must recognize the key role of scientific research for the development of teaching staff, and treat it as a necessary investment in continuous and sustainable development.

Quality grade: Satisfactory level of quality

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

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

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

Analysis:

The internal quality assurance system is largely functional, and covers and evaluates most of the HEI activities. In accordance with the Department's Development Strategy 2016-2021, the bodies in charge of implementing the quality policy are the Department Council, the Department management, heads of organizational units, Department's standing committees in charge of different areas, and the Quality Assurance and Enhancement Committee. The Office for Quality Enhancement and Assurance provides administrative support. The internal audit reports of the quality assurance system are analysed on an annual basis, which, in the Panel's opinion, needs to be intensified.

Although the internal quality assurance system formally includes all HEI stakeholders, representatives of employers and the alumni (especially graduates of teacher training specialisation) need to be more significantly involved in the analysis and planning.

The Department's SWOT analysis identified its weaknesses, but did not offer any solutions, especially those related to the teaching capacity, i.e. the workload of teachers. The Panel thinks that, in order to solve this problem, the University management must get more actively involved by timely providing coefficients for new jobs and for excellence-based improvements.

The introduction of internal student surveys conducted at the end of each semester is commendable, and provides valuable information on the quality of teaching performance. In this sense, it is worth considering the introduction of an award for outstanding contribution to working with students, which would annually highlight teachers who have been particularly active and highly valued by students.

Otherwise, the reward system for other activities has been formally established, but has not really taken root in practice. Regular awarding of scientific contributions (in the category of young scientists), as well as the awards for students for exceptional study success would certainly have a positive impact on quality assurance.

Recommendations for improvement:

Mechanisms for monitoring the quality of scientific-research work exist, but are not formalized. In this sense, it would be good to prescribe formal indicators of scientific and

teaching excellence at the level of the Department, i.e. regulate the advancement of teachers.
Human resources policy should be carried out on a longer-term basis, which requires greater support for the Department from the University.
Also, a suggestion is to regularly submit reports to the Department Council on the work of doctoral and postdoctoral students, which can be regulated by adopting the appropriate Ordinance.
It is recommended to regularly award prizes for scientific and teaching work, as well as prizes for best students.
It is recommended to establish an Economic Council that would include representatives of the alumni and stakeholders from the real sector.
The number of existing organizational units (chairs and research groups) should be reduced in order to relieve teachers of additional administrative responsibilities. On the other hand, it is worth considering the establishment of a research group for methodology, which would be formally in charge of teacher education.

Quality grade: Satisfactory level of quality

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

Analysis:
Based on the external evaluation of the Department conducted by ASHE in 2015, and the subsequent monitoring of part of the activities, certificates of fulfilment of the conditions for performing higher education activities were issued for all study programmes delivered at the Department. The Department bodies analysed the received reports, adopted action plans for improving its quality in a timely manner and, based on these, planned further development.
In the Panel's opinion, the Department has partially implemented the recommendations for improvements. Student representatives are more significantly involved in the work of the Department's standing committees. Internal surveys on the quality of teaching have been introduced, and significant progress has been made in the area of students' extracurricular activities. The number of research groups and topics has been reduced, and that trend should be continued in order to focus the quality and resources in areas where the Department is internationally recognized. Compared to 2015, the number of scientific research projects has increased, but, in the opinion of the Panel, not enough.
On the other hand, almost nothing has been done to reduce the external engagements of the Department's teachers, which certainly negatively affects scientific productivity, especially of young researchers. Given that, at the time of its establishment, the Department undertook the obligation to teach mathematics courses at other University

constituents, the Panel is aware that no significant progress in this direction is possible without the help of the University.
Finally, the Department made the necessary preparations for a joint graduate study of mathematics and physics, but the appropriate response from the Department of Physics is lacking.

Recommendations for improvement:
Given that the Department has partially implemented the improvement recommendations from the previous, 2015 external evaluation of the quality assurance system, the Panel recommends the implementation of the following proposals:

- encouraging researchers, especially younger ones, to apply for competitive projects (for example, the Establishment Research Projects of the Croatian Science Foundation); this opens the possibility of additional employment that is necessary for the Department
- encouraging teachers for longer study stays abroad and establishing new collaborations; in this sense, it is necessary to redefine the relationship with the University in order to reduce external cooperation
- reducing the number of employees in the administrative services of the Department and conversion of the exempted coefficients in favour of the teaching staff.

Quality grade: Satisfactory level of quality

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

Analysis:
The Department pays attention to respecting academic integrity and freedoms and preventing unethical behaviour, intolerance and discrimination. The basic ethical principles and values are defined by the Code of Ethics of the University of Osijek. The implementation of these principles at the Department is under the jurisdiction of the Ethics Committee, whose members include a student representative. The University Ordinance on the Disciplinary Responsibility of Teachers and Associates regulates the disciplinary responsibility of teachers and associates and served as the basis for the appointment of the Disciplinary Court for Teachers and Associates.
The Department also has a student ombudsman who receives complaints from students regarding their rights.
The university survey, which is conducted once a year, gives students the opportunity to answer questions related to discrimination. According to the data available in the Self-evaluation, there are nevertheless students who have experienced certain forms of discrimination, harassment and unwanted behaviour while studying.

The Ordinance on Final Examinations for the Master's Degree and the Ordinance on Final Papers regulate the procedures for when plagiarism is detected. Mentors and editors of journals published by the Department have access to the appropriate software for verifying the originality of papers. According to information from the Self-evaluation, which was confirmed in the interviews conducted during the virtual visit, no disciplinary proceedings have been initiated at the Department in the last five years, and no proceedings that would require the involvement of the Ethics Committee.

Recommendations for improvement:

The Panel suggests a more significant engagement of the Ethics Committee. Namely, the fact that the Ethics Committee has not conducted any proceedings in the last five years indicates that certain irregularities that must surely occur are resolved in informal ways, which is not good.

Since sporadic reports of discrimination were recorded in the surveys, it is recommended to open a secure channel that would allow students to report such acts without hesitation.

Given the growing number of "predatory" journals and conferences, it is proposed to increase the involvement of mentors who can point out these phenomena to young researchers.

Quality grade: Satisfactory level of quality

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

Analysis:

Information on the work of the Department is available through the Department's website, which is clear and well maintained. Among other things, the English language website contains all the necessary information about the study programmes delivered by the Department, which is especially important in terms of incoming mobility. Also, website includes a Database of scientific and professional papers of the Department's teachers and associates, as well as a Database of scientific and professional projects implemented at the Department.

The popularization activities with which the Department presents its study programmes are at an enviable level, and here the Panel must emphasize the involvement of all teachers and associates of the Department.

Promotional videos are also available on the website, as well as all editions published by the Department, which is commendable.

Recommendations for improvement:

In addition to the existing activities that need to be continued, the Panel proposes that the Department initiates its Open Days, where its employees would present the results from the scientific fields in which they work, as well as promote study programmes.

Quality grade: High level of quality

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

Analysis:
In the previous period, the Department developed and formalized a strong cooperation with companies from the IT sector. The Department confirmed its commitment to this cooperation by launching a new undergraduate study programme in Mathematics and Computer Science, which demanded a huge effort invested by its teachers, especially those in computer sciences.
The connection between students and potential employers is maintained through student internships in companies which have signed cooperation agreements with the Department, as well as by holding a Working Seminar that features lectures by experts from the economy.
The Department also recognizes its important role in educating and taking care of teachers in primary and secondary schools in the region. This connection is maintained through the organization of several professional conferences and workshops for teachers of mathematics and informatics, as well as through cooperation with organizations of the civil society.
Finally, the Department provides a strong impetus to the development of its social role by participating in the implementation of a number of applied projects that are of general interest to the community.

Recommendations for improvement:
Systematic and direct acquaintance of students with opportunities for employment and career development, and connecting employers with students of the Department can be achieved by opening a Career Center or by organizing a Career Day at the Department.
Also, in order to further emphasize its concern for the teaching staff in primary and secondary schools, the Department could consider introducing an award for outstanding contribution in working with pupils, which would be periodically awarded to teachers of primary and secondary schools in the region. The Panel also suggests putting in effort to improve the social role of the alumni organization.

Quality grade: High level of quality

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

Analysis:
In addition to organizing professional conferences and workshops for teachers in primary and secondary schools, the Department has previously offered two lifelong learning programmes: Applied Statistics and Mathematics in Financial Transactions. Both programmes are in line with the Department's orientation towards applied mathematics and the social needs. The programmes are adequately presented on the website, where it is possible to find all relevant information.

Recommendations for improvement:
The Panel thinks that the Department needs to intensify its efforts to offer lifelong learning programmes. As a step in this direction, it would certainly be worthwhile to cooperate with another University constituent from the area of Social Sciences and launch an accelerated programme of methodological courses for students who completed non-teaching study programmes.

Quality grade: Satisfactory level of quality

II. Study programmes

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

Analysis:
The Self-evaluation states that all University constituent have an obligation to explain the compliance of study programmes with the mission and strategic goals of the University, which the Department duly does and regulates through its documents, such as the Development Strategy 2016-2021 of the Department of Mathematics, which clearly lists the strategic and general goals of the Department.
The justification for delivering study programmes is explained in relation to social / economic needs because, for example, the new undergraduate university study of Mathematics and Computer Science was launched as a direct consequence of continuous cooperation with Osijek Software City member companies and labour market needs. This study programme has been modelled on similar computer science / mathematics

undergraduate studies at European and US universities, and leads to clearly defined and regulated professions, same as all other studies of the Department.
The employability of the Department's graduates is among the highest at the University, and the Self-evaluation states that more than 90% of graduates are already employed at the time of promotion (not more than 6 months after graduation).
A better analysis of the HEIs necessary capacities for the implementation of new and current programmes. It remains debatable whether the Department really has sufficient capacity to cover the teaching needs of all its studies, while taking into account other needs of the teaching staff explained in other standards of this Report.

Recommendations for improvement:
Increase teaching capacities, especially those focused on the field of computer science.

Quality grade: High level of quality

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

Analysis:
Learning outcomes are clearly defined for each study, and aligned with the Department's mission and objectives.
The Department Council makes a decision on the curriculum implementation plan for the next academic year, which is also published on the website.
Several recent revisions of various study programmes show that the Department checks the harmonization of learning outcomes at the level of study programmes, and all study programmes versions and their detailed descriptions are publicly available.
In defining learning outcomes, the HEI acts in accordance with the requirements of the profession and internationally recognized standards for that profession, and ensures the modernity of the programmes. This was made obvious through the strong influence of the representatives of the local economy, which the Panel learned about from conversations with stakeholders from the economy, but also from students.
The intended learning outcomes clearly reflect the competencies needed to enter the labour market, where the Department graduates manage without difficulty. Based on the conversations with businessmen and the alumni, the Panel concluded that this was indeed the case.

Recommendations for improvement:
It would be good to update the study programmes at the undergraduate level with the aim of increasing the pass rate in the first year of study.

The transition from secondary to higher education needs to be facilitated, especially in the field of computer science where it is necessary to take into account the different levels of prior knowledge that new students have (which is usually very poor). In this regard, the Department should consider whether the course Functional Programming is really necessary in the first semester.

The undergraduate study of Mathematics and Computer Science lacks sufficient coverage of some fundamental mathematical areas. For instance, there is no course that has geometry in its programme, while combinatorics, probability, function analysis of multiple variables, and number theory are realized within a single course.

Since the courses English language I and II are taught to students of various specializations, teachers of mathematics and computer science courses should pay more attention to introducing basic mathematical concepts and phrases in English from the first year of study.

The idea of having a database of questions is good, but it hasn't quite taken root. It is necessary to consider introducing a final exam (in addition to or instead of a final thesis, at least in the undergraduate study of Mathematics) that would assess basic mathematical knowledge.

The cooperation with the Osijek Software City Association (OSC), which brings together a number of Osijek IT companies, is commendable. According to the Self-evaluation, this cooperation "has set up a continuous monitoring of the Department's study programmes through the monitoring of students…", but the contract with the OSC does not clearly show how and where has this actually been implemented. This cooperation was not formally implemented in a way that would enable the representatives of the local economic community and professional associations to have a direct and continuous influence on the study programme through participation in a council or a similar body.

It would be good to establish an Economic Council which, in cooperation with the Department councils, could better analyse individual courses, pass rates, learning outcomes and compliance with market needs

. This would lead to better decision-making about the necessary changes / additions to the existing curricula.

The Self-evaluation states that the Department invites former students who are successful in one of the industries (IT, banking and insurance companies), interviews them and thus gets feedback which serve as the basis for the planning and proposing revisions or changes to the existing study programmes. With this aim, employers regularly hold lectures as part of the Department's Working Seminar, all for the purpose of obtaining feedback on the quality of graduates. According to the nature of the studied seminars (Department's Working Seminars), it seems that the lectures take place, but no decisions are made on the potential improvement of studies / courses, so it is recommended that feedback from graduates and their employers or associates be systematically integrated

through formal means of graduates and employers' participation in Department councils for the purpose of developing study programmes, courses and learning outcomes.

Quality grade: Satisfactory level of quality

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

Analysis:
The Self-evaluation states that all courses have a clearly defined workflow and method of assessing learning outcomes that is available to students on the course website, and is defined by the study programme itself, which the Panel confirmed. It has been said that students can always access examples of written exams through internal communication channels (course websites, Merlin, MS Teams), but no examples of revised learning outcomes, changes in the teaching process, etc. have been given.

Recommendations for improvement:
Student surveys and interviews with students revealed that the exam terms of all colloquia are not clearly defined for all courses at the beginning of the semester.
Additionally, students said that, in some courses, there is a big difference between the material taught in lectures and exercises, and exam assignments. That is why students cannot adequately prepare for some course exams, because they are not given enough exercises of adequate difficulty. The Department should establish mechanisms for detecting such discrepancies, and help teachers and other teaching staff to more adequately address such 'holes', i.e. problem areas that prevent students from acquiring adequate knowledge and skills to pass the final exam of each course.
Likewise, student surveys need to be better interpreted. In several places it is stated that some course exercises are problematic because they do not cover a more advanced understanding of the work with tasks / application / programming. At these exercises, students are given homework that they do not understand. The problem is that the homework is assigned by teachers who give *ex cathedra* lectures with a lot of code or formulas. Also, in several hours of lectures, teachers do not receive any feedback from students on their understanding of the material. This naturally results in increased pressure on the person holding the exercises regarding the understanding of the homework.
There is a lack of a quality mechanism for making bigger changes when such situations are encountered.
As a consequence of the problems mentioned in the last remark of standard 2.2, the achievement of some of the intended study programme outcomes (e.g. PM20, PMR4, PMR8, PMR9, PMR12) is in question. Recognizing the fact that the undergraduate study

of Mathematics and Computer Science is, *de facto*, a two-major study that is highly tailored to the needs of the market (IT sector), the Panel believes that math students should nevertheless have a broader knowledge of fundamental branches of mathematics.

Quality grade: High level of quality

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

Analysis:
Development activities related to study programmes have already been explained in the previous questions, along with an exhaustive commentary. The planning and proposing of new study programmes includes an analysis of justification, capacities and compliance with strategic goals at the local and national level and other needs of the society, which is clearly seen in the example of the introduction of the Mathematics and Computer Science study programme.
Current versions of study programmes are clearly described and publicly available.
The Panel commends the practice of encouraging postdocs and junior assistant professors to introduce new courses related to their specialization.

Recommendations for improvement:
It is recommended to introduce the option of studying with working for graduate studies. Of course, the recommendation is to first conduct a capacity analysis and see if there is room for this mode of teaching.
It is necessary to increase the availability of recorded changes in study programmes, and conduct systematic and regular analyses of the implemented changes in cooperation with key stakeholders (businessmen, alumni, etc.).

Quality grade: Satisfactory level of quality

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

Analysis:
The Panel applauds the procedure through which students, via an internal survey conducted at the end of each semester, estimate the number of ECTS credits of the courses they have taken based on the actual workload and compare them with ECTS credits awarded by the study programme. This clearly proves that the Department harmonizes ECTS credits with the actual student workload based on the analysis of stakeholder feedback in the teaching process and other procedures. This is confirmed by the reports

on the 2017 changes to the existing undergraduate university study Mathematics, and changes of more than 20% to the existing graduate university study Mathematics conducted in 2019 that, in addition to introducing new courses and refreshing content on the existing ones, included an adjustment of ECTS credits based on the received feedback. Feedback on the results of the analysis of the collected data and the implemented changes are publicly available to all, including students, and their examples can be found on the Department's website.

Recommendations for improvement:
The Panel has no formal recommendations for this standard.

Quality grade: High level of quality

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

Analysis:
The HEI allows for learning and obtaining new skills through student practice, where applicable. This is clearly stated in the Self-evaluation where Professional Practice is defined as an elective course that carries 4 ECTS credits, and is performed at the undergraduate university study in Mathematics and Computer Science and the graduate university study in Mathematics. The Self-evaluation also talks about a mentoring programme as well as the procedure for conducting professional practice. Students do their practice by working on specific project tasks in appropriate companies, which have typically signed a cooperation agreement with the HEI. It is also stated that Department students are in high demand and have no problem finding a company in which to do an internship. It can be concluded that students search for internship opportunities themselves, which should not be the case unless students explicitly ask for such an option. The Self-evaluation states that the Methodical Practice takes place in selected primary and secondary schools under the expert guidance of teachers - practitioners (mentors to students), but the Expert Panel learned from conversations with students that in most situations students must find an internship themselves. This flexibility allows students residing outside Osijek to do part of their internship closer to home. However, the rules that the school / institution / company must meet in order for students to acquire adequate knowledge during the internship are not clearly defined for such situations.
According to the information provided, the biggest problems with finding internship are faced by students who major in Financial Mathematics and Statistics, who often fail to find internship in the region.

Recommendations for improvement:

The Panel believes that the Department should offer more internship options to graduate students in Financial Mathematics and Statistics. Given the limited choice in the financial sector in the region, the option of online practice should be considered in agreement with Croatian companies.
Furthermore, the Panel proposes to formalize the selection of mentors for teachers. The HEI should offer a list of mentors of proven quality, and formally provide options to those students who cannot find a mentor for the second part of professional practice. Flexibility in choosing a school for doing the internship is commendable, but the Department should have control over the work of individual mentors.

Quality grade: Satisfactory level of quality

III. Teaching process and student support

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

Analysis:
The Department has clearly defined criteria for enrolment and continuation of studies for each study programme, which are regularly updated on the Department's website. Criteria for enrolment or continuation of studies are consistently applied through the work of the Admission Committee, which regularly checks whether candidates meet the basic criteria or have possible additional achievements and, based on that, makes a decision on the enrolment / continuation of studies. Criteria for enrolment in undergraduate studies, with an emphasis on the result of the State Matura in Mathematics, ensure the enrolment of candidates with a high level of prior knowledge. Additional scoring for special achievements encourages the enrolment of highly motivated candidates. The recent restructuring of study programmes resulted in a more uniform level of interest for different study programmes at the undergraduate level, or rather in a reduction of differences in the entry levels of competencies of students of different study programmes. To continue studies at the graduate level, students should meet the criterion of having 180 ECTS credits from mathematics and computer science courses, which allows the selection of students with the appropriate level of prior knowledge. Recognition procedures are defined, but there are no publicly announced procedures and examples of conducted recognition procedures of domestic and foreign higher education qualifications, periods of study and prior learning for the purpose of continuing studies.

Recommendations for improvement:
The HEI should give practical examples of recognition of domestic and foreign higher education qualifications, periods of study and previous learning for the purpose of continuing studies, especially for cases of Erasmus+ exchange and foreign students, in order to encourage more active student participation in such programmes.

Quality grade: High level of quality

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

Analysis:
Procedures for monitoring student progress are clear and accessible, and are published annually as part of the report of the Department head. Monitoring of work and knowledge, i.e. study success, is monitored based on pass rate date of one generation of students in the next academic year. The number of students that are enrolled each academic year is also monitored, and the HEI takes into account the results of mandatory student surveys, in which students have the opportunity to provide information on performance and point out problems that prevent them from mastering the material and making progress. Information on the reason for dropping out of studies is collected through forms that students fill out they withdraw from the HEI.
Data on the students' pass rate, i.e. the percentage of first-year students who enrol in the second year, is in a continuous decline, as evidenced by statistics from the Self-evaluation. The HEI provides effective mechanisms for analysing the success and pass rates of students, but often does not initiate appropriate activities based on these results. Although the students' pass rate is monitored, the Panel has concluded that there is no satisfactory mechanism for the implementation of adequate activities in case of poor study performance.
An example of measures taken to help students is the involvement of demonstrators, selected from among the best senior students who help other students master the material. Students can give an anonymous opinion on the need to introduce demonstrations in an internal survey, which is organized every year at the Department. Also, a Preparatory course has been introduced, which has been running since 2017 in the form of an e-courses on the Loomen platform. Within the framework of their regular meetings, students also have the opportunity to inform their student mentor about various problems they encounter during their studies.
Given the graveness of the situation, greater measures should be taken - online courses and demonstrators are the only methods. Demonstrators in math and similar courses are common and necessary, while the online course does not actively involve any

stakeholders, except the student themselves who is left to go through the material on his own.
There is a lack of better mechanisms for detecting specific problems within a specific material, i.e. a way to detect "holes" in the students' knowledge or understanding whose mastery could help them acquire the missing knowledge and successfully master the material.
There is no attempt to detect students who are experiencing problems at an early stage (poor grades on the 1st mid-term) and offer help accordingly. There are examples of students with solid entry competencies dropping out of studies or achieving poor results, without a reaction from the Department that only conducts an analysis after a student drops out.
The average students of the Department is significantly worse compared to other University constituents. Demonstrators have generally proved useful, with the exception of demonstrators who do not continuously prepare exercises for problematic tasks and parts of teaching material, and are only available for occasional consultations as needed.

Recommendations for improvement:
Students need encouragement, stimuli and direct contact with someone from the teaching staff from the time when they first get bad grades because, besides the lack of knowledge, psychological shock of the first year of study combined with early bad grades can be crucial for further studies. In doing so, teachers do not have to invest too much extra time, but only analyse the mid-term results with the aim of helping students to better assess their own lack of knowledge/understanding, and then students can be referred to a demonstrator who can help them with specific problems. In such an arrangement, demonstrators may be overwhelmed and it is clear that the Department lacks teaching staff, but senior students would probably be happy to engage in these activities if they were better informed about how they could help their colleagues with specific problems. The HEI could open an online forum that would be accessible to first-year students along with senior students. In doing so, the moderator could encourage students to seek help or could be the one to send a message to the forum such as: "A 1st year student asks for help in understanding certain material. If someone has time for a couple of hours of online consultation to help a colleague." The forum can use a scoring system such as *Stackoverflow,* and students who prove themselves to be good helpers can receive real and useful rewards from the Department. Such a forum can be promoted at the beginning of each year to all students. Demonstrators and the usefulness of that system should certainly not be left unattended, because it is a very critical process that is in the hands of students who do not have to have adequate teaching competencies; the fact that a student has good grades does not mean that they are good lecturers.

Quality grade: Satisfactory level of quality

3.3 The higher education institution ensures student-centred learning.

Analysis:

The Department encourages various modes of programme delivery in accordance with the intended learning outcomes. Teaching is delivered in different ways: through lectures (auditory), auditory exercises, methodical exercises (for teaching specialisations), laboratory exercises (computer practicums), and seminars. Teaching is also conducted extra-institutionally (in the form of internships in public and private companies and institutions, methodical exercises in schools for students of teaching specialisations). The method of teaching, i.e. the distribution of the number of hours for different forms of teaching, has been determined or rather adapted to each course depending on the learning outcomes. In addition to classical classroom lectures and exercises, a number of teaching methods are used that enable students to acquire practical skills, experience of encountering real problems, develop critical thinking, creativity, etc. Creative and critical thinking and independence are encouraged in undergraduate students through laboratory exercises and writing seminars, as well as the preparation of the final paper. Through a considerable number of seminars, the graduate study encourages further independence of students, as well as the development of their expert knowledge in a specifically selected area with regard to the field of study. Also, the presentation of individual projects encourages the development of communication and presentation skills. When students present their seminar papers, other students are encouraged to ask questions and discuss.

Teaching methods are assessed and adapted, and this process includes the teaching staff, students (through surveys) and, most often informally, alumni and business people. Based on student feedback gathered through internal surveys on their satisfaction with courses and teachers, minor changes are regularly made to methods of teaching delivery (for example, students stated that it is much easier for them to master the material if they are given smaller tasks on a weekly basis, so the HEI introduced such a system).

The HEI ensures the use of advanced technologies with the aim of modernizing teaching, but the usage of these technologies often depends on individual teachers. Students should not have different systems for getting standard course material.

Available and dedicated teachers contribute to motivating students and their engagement, as evidenced by the students themselves.

Teachers are available to students for consultations, additional clarifications, and support in the form of counselling and finding the desired internship during and outside working hours.

The HEI encourages students' independence and responsibility through participation in projects, student internships, guidance in the selection of elective courses during their studies and various organized extracurricular activities.

Recommendations for improvement:
It is necessary to abolish the *indeks* and introduce an electronic way of recording exam grades. It is also necessary to choose a system that will be used as a basic platform for other teaching activities, except for online lectures that use MS Teams. If the HEI uses MS Teams, then it should use it systematically, and not have multiple systems for the same functionality.
Also, it is necessary to enrich courses with other online activities - forums, online assignments, knowledge quizzes, and tools for visualization of material.
Additional content should be given more frequently, especially to students who are having trouble with the material.

Quality grade: Satisfactory level of quality

3.4 The higher education institution ensures adequate student support.

Analysis:
The HEI provides students with counselling on matters connected to their study and, to some extent, career opportunities. There is a mentor for every year - a teacher who is in charge of reporting problems, questions, difficulties, remarks and suggestions that pop up throughout the year. At students' request, teachers provide information on career opportunities, and there are events such as *Mathos Banking day* and *BBQ party* sponsored by local companies, which promote local entrepreneurs.
In addition to permanently available teachers/assistants, demonstrators are also available to help with teaching.
There is a student ombudsman who advises students on their student rights.
Psychological counselling is provided through Counselling Center at the level of the university.
Support for students with disabilities is available through the Office for Students with Disabilities at the University.
The ECTS coordinator provides support for student mobility, and Erasmus+ exchange forums have been organized for the purpose of informing students.
The library is functional, and the working space in the reading room is opened only in the morning due to the lack of staff, but the Department has arranged spaces for work in the corridors.

Recommendations for improvement:
In addition to mentors of the year, the suggestion is to consider the introduction of a student-mentor who would help first-year students.
It is necessary to motivate student representatives with awards for excellence in their work on the improvement of quality, and regularly educate them about the current

opportunities that the Department provides to students so that they would have all the information they need to pass to other students.
It is also proposed to introduce a buddy programme for first-year students, where senior students would help freshmen in various ways (through conversation, sharing tips, experiences…).
These measures would certainly help with the critically low pass rate of first-year students, and would additionally help students who come from distant cities to study in Osijek with fitting into the community and gaining acquaintances.
The HEI also lacks an organized group event that would present all potential employers, such as Career Day / Career Week.
It is necessary to establish a Career Counselling Center, as well as to organize an annual forum / seminar where students would be acquainted with their rights.
It is also necessary to promote mobility through the experiences / stories of outgoing students, not only on a forum but also, for example, on the website.
Finally, the HEI should find a way to relieve the person working in the library.

Quality grade: Satisfactory level of quality

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

Analysis:
The HEI monitors the different needs of students from vulnerable and underrepresented groups who receive support through the work of the Office for Students with Disabilities established by the University. Vulnerable and underrepresented groups of students in need of financial support have the opportunity to contact the Committee for Education and Student Affairs. This Committee, in cooperation with the head of the study, may exempt students from paying all or part of the tuition fee. For example, during the great flood that hit eastern Croatia in May 2014, students from that area were exempted from paying tuition fees.
Students' problems and needs are monitored through surveys or the complaint box set up in the hallway.
The teaching process is adapted to the individual needs of students from vulnerable and underrepresented groups.
The Department did not have many such cases, but those few cases were solved by adjusting the time of writing the exam if necessary, or allowing for the possibility of suspending study obligations due to health problems or other justified reasons. All such cases have been reviewed by the Committee for Education and Student Affairs.

Recommendations for improvement:

The Department should have a secure channel for reporting discrimination and abuse.
The information that vulnerable and underrepresented groups of students who need financial support can contact the Committee for Education and Student Affairs should be made public on the websites or something similar.

Quality grade: High level of quality

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

Analysis:
Students are informed about the possibilities of attending part of their studies abroad through various forums, which are poorly attended. Students cite a general lack of interest in going on exchange as the reason for low attendance, while the main reason for interested students is the impression that they can find all the information faster on their own.
Students are not aware that they can choose an institution that is not on the list of concluded agreements; it is certainly positive that agreements are made with institutions when students express a desire to go to them.
The Department provides support to students in applying for and implementing exchange programmes through the ETCS coordinator.
The HEI has concluded some exchange agreements, but their number is relatively small.
The exchange can be realized through the Erasmus+ study stay programmes, as well as through professional internships and the IAESTE programme.
The Department ensures the recognition of ECTS credits acquired at other HEIs through the concluded learning agreements, and in agreement with the ECTS coordinator.
The Department collects data on student satisfaction with the quality of the HEI support for practical issues of student mobility, which is mainly done through a survey conducted on all students who went on an exchange.
Students acquire very weak competencies needed to work in an international environment. Students' knowledge of the English language is weak, and the Panel learned from conversations with students that most students have a relatively weak interest in listening to courses in the English language.

Recommendations for improvement:
There is a need for a better promotion of all mobility programmes in order to raise the motivation of students for going on exchange. In general, motivation is low, which is partly due to a lack of English language skills, and partly to an insufficient awareness of the benefits of the exchange.

Non-IT students are not particularly exposed to literature in the English language. Courses related to learning English should encourage students' independence in using the language and raise their level of motivation so that they would, for example, read an article in English from the field of their interest in mathematics and make a report / presentation in English.
It is necessary to encourage the development of foreign language skills through other courses (occasional writing of seminars in English, recommended literature in English, etc.), and the Department should definitely have one course taught in English (at least an elective course).

Quality grade: Minimum level of quality

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

Analysis:
For international students, information on enrolment and study opportunities is available on the Department's website in the English language, but there should be more promotional videos in English of other kind – with more information on the Department, the city, the region, and more information about how to acclimate to the new location, the experiences of other international students and the like, which would attract students.
The Department provides support to international students in applying and studying at the Department through the Department's ECTS coordinator who is available to incoming students. The ECTS coordinator analyses the learning agreement with incoming students, and helps them to establish contact with course holders, as well as with other procedures important for studying, such as getting a student card, becoming acquainted with the student office, library, etc.
The Department gets feedback on the satisfaction and needs of international students, but only through communication with the ECTS coordinator.
International students have the opportunity to follow classes in a foreign language (English), but only through consultative classes because there are so few of them.
Teaching capacities for holding lectures and exercises in English in case of a larger number of incoming students are insufficient.
The Department provides the opportunity to learn the Croatian language through cooperation with the Faculty of Humanities and Social Sciences of the University.

Recommendations for improvement:
It is recommended to introduce a survey for international students.
It is also recommended to use various projects to hire foreign PhD students.

Quality grade: Minimum level of quality

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

Analysis:
Criteria and methods of evaluation and assessment are clear and published before the start of individual courses on the Department's website, and this information is emphasised to students at the beginning of each course by the teachers.
Criteria and methods of evaluation and assessment are harmonized with the teaching methods, but in some courses, according to surveys, it happens that the teacher shows a lot of finished codes without a detailed explanation and without checking how much the students understood, and students do not use computers in class nor can they reproduce this material in another way during the lecture. At the same time, they are expected to display a higher level of independence and creativity in solving more complex tasks.
The Department does not provide systematic support in developing skills related to testing and examination methods to everyone who is involved in evaluating students.
The Department ensures the objectivity and reliability of assessment, and a way to identify irregularities through student surveys, which also include an evaluation of the assessment procedures. Assessment procedures take into account the specific circumstances of studying for certain groups of students, for example, it allows for extended exam writing time for students with poor ability to concentrate / dyslexia and similar difficulties.
Students receive feedback on assessment results on request, together with advice on their learning process, if necessary.
Some assistants advise the student on which part of the material should be repeated and what are the key problems that have led to poor results.
Exam results cannot be accessed by outsiders who do not have access to the system, but students can see each other's results, which is only partially compliant with the GDPR.

Recommendations for improvement:
Some courses do not have clearly defined lists of mid-term and exam dates at the beginning of classes - this must be corrected.
There is no systematically organized way for teachers to share teaching experiences with each other. It is recommended to introduce a mandatory seminar for teachers, where the teaching staff of the Department can share experiences in teaching, and the teaching methods that have proved to be extremely successful. The current seminar is intended for students of teaching specialisations, and not for the Department teaching staff.
It is necessary to pay attention to the assessment procedures in some courses, for which students have expressed their dissatisfaction.

It is recommended to anonymize the exam results, so that students can only see a list with codes assigned to them, instead of a list of first and last names.

Quality grade: Satisfactory level of quality

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

Analysis:
Upon the completion of studies, students are issued appropriate documents (diploma and supplementary study document) in accordance with the relevant regulations. The Diploma Supplement is issued free of charge in the Croatian and English language.

Recommendations for improvement:
The Panel has no formal recommendations for this standard.

Quality grade: High level of quality

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

Analysis:
The Department analyses the employability of graduates through regular analyses conducted by the Quality Assurance Office based on data from the Croatian Employment Service, Regional Office Osijek.
All Department study programmes are on the list of shortage occupations.
There is great interest in the undergraduate study of Mathematics and Computer Science, but the enrolment quota is in line with the number of students who meet the enrolment criteria and the teaching and institutional capacities.
Already immediately after graduation, only a small percentage of graduates are unemployed.
The Department provides partial support to students in terms of future career planning. There are different manifestations, as well as a system of mentoring, but it is important to work on professional guidance for students, irrespective of the fact that they can find a job without major problems. The contact with the alumni is partial, because there is no alumni club. Contacts are reduced to individual graduates participating in forums and similar activities.
Alumni are asked to participate in alumni forums and sometimes in the changes of study programmes.

Recommendations for improvement:
Attention should be paid to where students are employed, not just whether they are employed. It is recommended to establish an alumni club, and to systematically maintain its activities. It is also necessary to actively involve them in the Department councils so that the alumni could have an influence on the current curricula.

Quality grade: Satisfactory level of quality

IV. Teaching and institutional capacities

4.1 The higher education institution ensures adequate teaching capacities.

Analysis:
The Department's study programmes are implemented by a total of 7 full professors, 10 associate professors and 9 assistant professors. Furthermore, the Department employs 6 postdocs, 7 assistants and 2 teachers elected into teaching grades. In addition, the Department hires 12 external teachers who participate in the implementation of two undergraduate and three graduate study programmes. In the academic year of the re-accreditation, there were a total of 492 students studying at undergraduate and graduate studies. In accordance with the above data, the Panel has concluded that the ratio of teachers and students is favourable, and that teaching at the Department is largely covered by its own staff. The teaching load that falls within the norm is assigned by taking into account the involvement of individual teachers in research work, and this should be commended. At the same time, the Panel expresses concern that this is not possible for teachers involved in the implementation of computer courses at the undergraduate and graduate study of Mathematics and Computer Science.
Furthermore, what the Panel considers problematic is the significant out-of-norm engagement of most teachers at other University constituents, which greatly affects the time available for engaging in research activities. This is especially evident in younger teachers in associate grades, whose scientific productivity and mobility are rather poor.

Recommendations for improvement:
The Panel is of the opinion that most of the Department teachers are overburdened with teaching duties, which has a negative impact on scientific research. The reason for this is the significant teaching load outside the norm that the teachers are obliged to perform based on an agreement with the University. In this regard, the Panel reiterates the need to redefine the Department's relationship to the University. In particular, the University

should respond by approving additional coefficients for new employment in the Department.
On the other hand, with greater involvement in applying for Croatian Science Foundation projects (only 3 applications in the previous period), the Department could provide new employment.
Furthermore, to help teachers of computer science courses, it is recommended to engage in teaching additional experts from the IT sector, especially in the implementation of specialist courses at the graduate level of study.
The Panel also points to the possibility of obtaining a new position through the scientist-returnee programme that is approved by the MSE.

Quality grade: Satisfactory level of quality

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

Analysis:
Recruitment procedures and the implementation of appropriate elections to scientific-teaching, associate and teaching grades are carried out in accordance with legal regulations and internal acts. The Panel is aware that the system of job complexity coefficients used in Croatia, with a constant sum of coefficients given to each institution, limits the opportunities for employment and promotion to higher grades. However, the Panel finds it unacceptable that coefficients released by teachers' retirement are not immediately and fully returned to the Department of Mathematics, but that it only gets to hire one assistant / postdoc / assistant professor. The responsibility lies primarily on the University management, which in this way negatively affects the possibility of longer-term planning of personnel policy at the Department, i.e. the advancement of teachers based on excellence.
The employment and promotion of teachers to higher grades is not conditioned by prescribed additional criteria of excellence at the level of the Department, nor is there a permanent body that deals with this issue.

Recommendations for improvement:
The Panel calls on the University management to change the practice of issuing approvals for coefficients that are released upon the retirement of teachers or the termination of employment contracts. It is absolutely necessary for the Department to know in advance what coefficient it has at its disposal in order to be able to plan long-term employment, or rather promotion to higher grades. In this sense, it is recommended that additional criteria of excellence be formally prescribed at the level of the Department, which would include scientific and teaching activity, and which would be taken into account when

selecting teachers into grades. These criteria should certainly include activities related to competitive research projects and mobility.

Quality grade: Satisfactory level of quality

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

Analysis:
It is commendable that the Department provides a programme of general pedagogical-psychological and didactic-methodological education for teachers who are elected to the scientific-teaching or teaching grades for the first time (and have not completed teaching specialisation studies).
Also, the *Decision on the allocation of financial resources for scientific activity by research groups* prescribes an evaluation of previous scientific work, which is certainly motivating.
Moreover, the *Ordinance on rewarding teachers and associates* enables the awarding of exceptional candidates. Awards prescribed by this Ordinance should be given out regularly, and, in the opinion of the Panel, the corresponding cash prizes should be spent exclusively for the intended purpose (mobility and dissemination).
We emphasize that the mobility of teachers and associates in the last five academic years is not at a satisfactory level. Table 4.5 of the Self-evaluation shows that only one teacher used the possibility of a study stay abroad for three or more months, while no Department teachers used the right to a free study year (sabbatical). The Self-evaluation states that the reason for the latter are teaching obligations.

Recommendations for improvement:
The Panel recommends that the Department's management more strongly encourages the scientific development of teachers, especially young researchers. This primarily refers to longer study stays abroad, as well as greater engagement in applying for competitive scientific research projects. Measures that would contribute to this are primarily related to relieving young researchers of teaching obligations, which is why the Department management is encouraged to consider limiting (or completely abolishing) the possibility of external cooperation for young researchers. Another measure would be to prescribe additional criteria of excellence at the Department level, which would include the above activities and would be taken into account during elections to different grades.
Finally, teachers in charge of computer science courses at the undergraduate and graduate study of Mathematics and Computer Science need to be provided with continuous professional development.

Quality grade: Minimum level of quality

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

Analysis:
The Panel is satisfied with the Department's infrastructure and considers it appropriate for the implementation of study programmes and the achievement of the intended learning outcomes. The entire infrastructure (teaching halls, computer practicums, hardware and software resources, teacher cabinets) is adequate and well maintained. The Panel believes that the Department management will strive to further modernize and improve their infrastructure, and suggests that these plans be included in the development plan. The Panel would also like to bring up the possibility of obtaining additional funding through EU infrastructure projects.

Recommendations for improvement:
The Panel has no formal recommendations for this standard.

Quality grade: High level of quality

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

Analysis:
Library space and resources are fully adequate. The library also contains 20 workstations for students, and free access to all publications of the Department of Mathematics. The library services meet the needs of the teaching staff and the implementation of quality scientific research. The electronic resources available to students and the teaching staff are at a satisfactory level. The Department has enabled procurement of certain additional electronic resources, and this practice should be continued. The library's website is well maintained and contains all the necessary information.

Recommendations for improvement:
The Panel has no formal recommendations for this standard.

Quality grade: High level of quality

4.6 The higher education institution rationally manages its financial resources.

Analysis:
Department revenues come from the state budget, from scientific, professional and development projects, tuition fees (participation), lifelong learning programmes and the sale of books published by the Department. The Panel thinks that the Department manages its financial resources transparently, efficiently and purposefully. We especially welcome the fact that the Department uses its own financial resources to invest in its space and equipment, with the aim of improving teaching and scientific research processes.
Although it shows a trend of growth, the share of project revenues in the total revenues of the Department is still not at a satisfactory level.
The University retains as much as 33% of tuition fees and 5% of professional projects.

Recommendations for improvement:
The Panel calls on the University management to propose a reduction in the percentage it retains from tuition fees, and thus increases the revenues of the Department. The Panel recommends that the Department adopts an Ordinance on the allocation of own funds, which would, among other things, specify the percentage for indirect costs (overhead) of professional projects.

Quality grade: High level of quality

V. Scientific/artistic activity

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

Analysis:
The scientific production of teachers is at an acceptable level. The Database of Scientific and Professional Papers shows that, in the past five years, each teacher has on average published six scientific papers in indexed journals. If we also account for co-authorship, the average is about 2.80 "full" papers per teacher. The scientific production of assistants and postdocs is slightly lower - the average is 2.20 (or 0.70 if we take into account co-authorship) papers over the past five years. Compared to the previous period, some progress is visible, but it is clear that there is still a lot of room for improvement.

The Department has established certain procedures to encourage scientific activity. For example, the Ordinance on rewarding teachers and associates has been in force since 2019, and provides the basis for awarding recognitions and monetary awards (from the Department's own funds) for outstanding scientific work, for applying for scientific and professional projects, and more.
A special award for young scientists up to 35 years of age is also planned.
Information on the proposed awards and the work of the Awards Committee is available in the attachments of the Self-evaluation.
In addition, when allocating funds for scientific research, part of the funds is distributed on the basis of publications in indexed journals.
The Department has an excellent, comprehensive, very clear and publicly available database of scientific and professional papers.
Information on new scientific and professional papers is also published on the front page of the Department's website.
In the past five years, seven Department employees have defended their doctoral dissertations, of which five were part of the joint postgraduate doctoral study of mathematics (Universities in Osijek, Rijeka, Split and Zagreb), and two of the doctoral study of computer science and information technology. It is clear from the titles of doctoral dissertations that doctoral topics arise from the scientific activities of the Department.
Teachers and associates of the Department actively participate in scientific conferences, but it is evident that most of them took place in Croatia. In the past five years, members of the Department have given 30 invited lectures at various conferences. This number shows that there is still plenty of room for improvement.

Recommendations for improvement:
It is necessary to further encourage scientific activity and professional independence of younger members of the Department.
It is also necessary to enable and encourage participation in conferences abroad, and co-authorship with international experts.
It is recommended to organize shorter (as well as longer, if possible) visits of foreign experts in order to increase the number of research topics and scientific participation.

Quality grade: Satisfactory level of quality

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

Analysis:

The Department is strategically oriented towards applied mathematics, and a large number of their scientific and professional papers are therefore relevant for social and economic development. The Department is an institutional member of the European Consortium for Mathematics in Industry (ECMI) and one of the co-founders of the Croatian Association for Applied and Industrial Mathematics (CRO-MATH-IN). Monitoring of social flows and needs is also evident in the already mentioned, extremely high employability of graduates.

Teachers and associates of the Department participate in the work and management of major domestic professional associations, such as the Croatian Operational Research Society, Croatian Statistical Association, and Croatian Mathematical Society (especially, the Association of Mathematicians Osijek). An extensive list of memberships in international scientific and professional associations is part of the accompanying documentation.

The Department has participated in two projects of knowledge transfer in the economy (analysis of magnetic resonance imaging, and monitoring and optimization of energy consumption). Given the Department's specialisation, it would be necessary to intensify this type of participation in the future.

The Department is extremely active in the field of dissemination and popularization of mathematics and related sciences, which is evident from a large number of seminars, public lectures and professional papers (data can be found in the publicly available database of scientific and professional papers). In the previous period, the Department organized or co-organized six international and nine domestic scientific and professional conferences (an overview is available on the Department's website).

Recommendations for improvement:

It is necessary to increase the number of scientific-research topics related to the needs of the economy.

Quality grade: Satisfactory level of quality

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

Analysis:

In the past five years, the Department has been the holder of three Croatian Science Foundation projects, and three related projects of career development for young researchers. Additionally, there were several other smaller bilateral and internal university projects. The total value of these projects is approximately four million Kuna (Table 5.3 of the Analytic Supplement). Given the size of the Department, this is relatively low, and leaves a lot of room for improvement. This is especially true for applications for

CSF projects, because Department members applied for only three projects in the previous period (all three applications were successful). Concerning projects in higher education, it is necessary to emphasize the relatively large GAMMA project within Erasmus+ programme.
Department members have won several scientific and professional awards, such as the annual award of the Croatian Operational Research Society.
The submitted documentation contains a list of over 30 invited lectures at international and domestic conferences (Table 5.4 of the Analytic Supplement), and data on memberships in the editorial boards of five international journals. We estimate that this is a solid level of activity that can still be increased.
A similar assessment applies to data on the citations of the Department's teachers and associates.

Recommendations for improvement:
It is necessary to increase the number of applications for competitive research and development projects.
It is especially important to encourage younger teachers and associates.
It would be good to consider rewarding or even partially co-funding highly rated project applications (ERC and CSF), which were not accepted due to high competitiveness.
In order to make the Department recognizable and motivate the staff for further work, we recommend that the Department works on intensifying candidacies of its prominent scientists and promising younger staff for appropriate awards and recognitions.

Quality grade: Satisfactory level of quality

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

Analysis:
The Department's strategic focus is predominantly on the development of applied mathematics. Scientific research work is organized through five research groups-chairs whose work is funded through projects, but also based on an annual decision on the allocation of funds. These activities are in line with the development vision and the Scientific Research Strategy (2017-2022), and are listed in the accompanying Report on the Implementation of the Scientific Research Strategy. It is commendable that the Report is quite comprehensive and detailed, and that it lists additional measures to improve activities.
Researcher mobility is solid (an average of 35 outgoing and a dozen incoming mobility per year).

Based on the financial reports and data on the available space, equipment and practicums, it can be concluded that the Department has the appropriate resources and that these resources are used properly.
Certain difficulties are the consequence of a big teaching workload of teachers and associates. Potentially the greatest danger for the further development of the Department is the very low mobility for longer periods of time (more than three months). This is especially pronounced in younger associates, which is why the problem needs to be addressed as soon as possible. The Panel knows that an important factor in this problem is the inability to hire new staff, which would allow for teaching relief and longer periods of scientific training.
On the other hand, it is necessary to commend the already mentioned activities and incentives for scientific and professional development through the awards and recognitions for scientific and professional achievements.

Recommendations for improvement:
Additional efforts are needed to address the problems caused by a low number of longer mobility stays of all teachers and associates, especially younger ones. Related to this is the need to reduce the average teaching load, which is a prerequisite for more intensive scientific research.
The Department and the University as a whole must recognize the key role of scientific research for the development of teaching staff, and treat it as a necessary investment in a continuous and sustainable development.

Quality grade: Satisfactory level of quality

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

Analysis:
The space and equipment available to the Department, especially computer equipment and a small humanoid robot, are used jointly for research and teaching purposes.
Students of all levels are involved in scientific research, which is evident from the attached lists of students whose final or graduate theses and doctoral dissertations are based on projects.
Each of the three projects of the Croatian Science Foundation employs one doctoral student as part of the Young Researchers' Career Development Project.
In the past five years, as many as 23 research and 30 professional papers co-authored by students have been published (data from the List of professional and scientific papers co-authored with students).

Scientific knowledge is systematically included in the contents of the courses taught by Department teachers. The Panel assesses the Department's achievements in this area to be at a very high level, which proves its commitment to connecting scientific and teaching activities.

Recommendations for improvement: The Panel has no formal recommendations for this standard.

Quality grade: High level of quality

APPENDICES

1 Quality assessment summary– tables

2 Protocol of the site visit

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

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

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

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

3.9 The higher education institution issues diplomas and Diploma Supplements in accordance with the relevant regulations.				**X**
3.10 The higher education institution is committed to the employability of graduates.			**X**	

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

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

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

Reakreditacija *Odjela za matematiku* *Sveučilišta Josipa Jurja Strossmayer u Osijeku* Address: Trg Ljudevita Gaja 6, 31 000 Osijek	Re-accreditation of the *Department of Mathematics* *Josip Juraj Strossmayer University of Osijek* Address: Trg Ljudevita Gaja 6, 31 000 Osijek

Link ZOOM: https://zoom.us/j/94507193497 - četvrtak, 8. 4 2021./ Thursday, 8 of April 2021

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

	Četvrtak, 8. travnja 2021.	Thursday, 8th April 2021
9:45 -10:00 (CEST)	Spajanje na poveznicu (link) ZOOM	Joining the ZOOM meeting via link
10:00 -10:45	• Predstavljanje AZVO-a • Predstavljanje sustava visokog obrazovanja u RH • Postupak reakreditacije • Standardi za vrednovanje kvalitete • Kako napisati Završno izvješće?	• Presentation of ASHE • Overview of the higher education system in Croatia • Re-accreditation procedure • Standards for the evaluation of quality • How to write the Final report?

Link ZOOM: https://zoom.us/j/96924580483 - od petka, 9. 4 2021., jedan link na sve iduće sastanke / from Friday, 9 of April, one link for all further meetings!

	Petak, 9. travnja 2021.	Friday, 9th April 2021
12:00 – 13:00 (**CEST**)	Testno spajanje na poveznicu (link) ZOOM – Stručno povjerenstvo, Odjel za matematiku UNIOS i koordinatorice iz AZVO-a	Testing the link for joining the ZOOM meeting – Expert panel, Department of Mathematics and ASHE coordinators
13:00 – 14:30	Sastanak Stručnog povjerenstva • Priprema za sastanke s Odjelom • Rasprava o Samoanalizi i popratnim dokumentima • Rasprava o unaprijed pripremljenim pitanjima • Imenovanje predsjednika Stručnog povjerenstva	Internal meeting of Expert Panel • Preparation for meetings • Discussion on the Self-evaluation report and supporting documents • Discussion on pre-prepared questions • Appointment of Expert Panel Chair

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

	Ponedjeljak, 12. travnja 2021.	Monday, 12th April 2021	Ime i prezime sudionika/funkcija / Name and surname of the participants/position
8:45 – 9:00 (CEST)	Spajanje dijela članova Stručnog povjerenstva na poveznicu (link) ZOOM	Joining the part of the Expert Panel members to the ZOOM meeting via link	
9:00 – 10:00	Sastanak s predstavnicima Povjerenstva za izradu Samoanalize i Ureda za unapređenje i osiguravanje kvalitete visokog obrazovanja	Meeting with the representatives of the Commitee for Self-evaluation Report and Office for Quality Assurance and Improvement of Higher Education	
10:00 – 10:15	*Pauza*	*Break*	
10:15 – 11:15	Sastanak s Upravom Sveučilišta (rektor, prorektori za znanost, nastavu, studente, međuinstitucijsku suradnju itd.) i Upravom Odjela (pročelnik, zamjenici pročelnika)	Meeting with the University Management and Department Management	
11:15 – 11:30	*Pauza*	*Break*	
11:30 – 12:30	Sastanak s predstojnicima zavoda i šefovima katedri	Meeting with the Heads of the departments	
12:30 – 13:15	*Analiza dokumenata*	*Document analysis*	
13:15 – 14:30	Obilazak Odjela (predavaonice, nastavni laboratorij/praktikumi, informatičke učionice, knjižnica i dr.) i prisustvovanje nastavi, ukoliko je moguće	Tour of the Department (classrooms, Laboratory's, computer classrooms, library etc.) and participation in teaching classes	
14:30 – 16:00	*Radni ručak u organizaciji AZVO-a (samo članovi Stručnog povjerenstva)*	*Working Lunch organized by ASHE (only Expert panel members)*	

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

	Četvrtak, 15. travnja 2021.	Thursday, 15th April 2021	Prezime i ime sudionika / Surname and name of the participants
8:45 – 9:00 (CEST)	Spajanje na poveznicu (link) ZOOM	Joining ZOOM meeting via the link	
9:00 – 10:00	Sastanak s nastavnicima u stalnom radnom odnosu (osim onih na rukovodećim mjestima)	Meeting with full-time employed teachers (except those in managerial positions)	
10:00 – 10:15	*Pauza*	*Break*	
10:15 – 10:45	Sastanak s: • voditeljem Ureda za studente • djelatnicima u poslovima vezanim uz znanost, projekte, međunarodnu suradnju i cjeloživotno učenje	Meeting with: • Head of the Office for Students • Employees in jobs related to Science, Projects, International Cooperation and Lifelong Learning	
10:45 – 11:00	*Pauza*	*Break*	
11:00 – 12:00	Sastanak sa studentima	Meeting with students	
12:00 – 13:00	*Kratka pauza za ručak,* *Interni sastanak Stručnog povjerenstava*	*Short lunch break,* *Internal meeting of the Expert panel members*	
13:00 – 13:45	Sastanak s vanjskim dionicima – predstavnicima strukovnih i profesionalnih udruženja, poslodavci, stručnjaci iz prakse, organizacijama civilnog društva…	Meeting with external stakeholders - representatives of professional organisations, professional experts, external lecturers, non-governmental organisations…	
13:45 – 14:00	*Pauza*	*Break*	
14:00 – 14:45	Sastanak s alumnijima (bivši studenti koji nisu zaposlenici Odjela/Visokog učilišta)	Meeting with Alumni (former students who are not employed by the Department/Higher education institution)	
14:45 – 15:00	*Pauza*	*Break*	

15:00 – 16:30	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions – if needed	
15:30 – 16:00	*Interni sastanak Stručnog povjerenstva – osvrt na prvi dan i prema za drugi dan*	*Internal meeting of the Expert panel members – comment on the first day and preparation for the second day*	

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

	Petak, 16. travnja 2021.	Friday, 16th April 2021	Prezime i ime sudionika / Surname and name of the participants
8:45 – 9:00 (CEST)	Spajanje na poveznicu (link) ZOOM	Joining ZOOM meeting via the link	
9:00 – 9:45	Sastanak s voditeljima znanstvenih projekata	Meeting with the Heads of research projects	
9:45 – 10:00	*Pauza*	*Break*	
10:00 – 10:45	Sastanak s asistentima i poslijedoktorandima	Meeting with Teaching Assistants and postdoctoral researchers	
10:45 – 11:00	*Pauza*	*Break*	
11:00 – 11:30	Organizacija dodatnog sastanka o otvorenim pitanjima – prema potrebi	Organisation of an additional meeting on open questions – if needed	
11:30 – 12:00	*Interni sastanak članova Stručnog povjerenstva*	*Internal meeting of the Expert Panel members*	
12:00 – 12:15	Završni sastanak s Upravom Odjela	Exit meeting with the Department Management	
	Kratka pauza za ručak i interni sastanak Stručnog povjerenstva – ocjenjivanje prema standardima kvalitete	*Short lunch break and internal meeting of the Expert panel members – assessment according to quality standards*	

SUMMARY

Department of Mathematics of the J. J. Strossmayer University of Osijek was founded on the 1st October 1999, as a first university department in Croatia. Since 2004, study programmes have been delivered in line with the goals of the Bologna Declaration. The Department operates in nicely set up and functionally equipped premises. The Department employs 25 teachers, 12 assistants and postdocs, and 16 employees in administrative, technical and auxiliary positions. Around 500 mathematics students are enrolled in two undergraduate and two graduate study programmes, which makes the Department the second largest such institution in Croatia. The working atmosphere is very good, and the teaching staff, administration, students and the alumni show a high level of satisfaction and belonging to the institution.

Among the Department's main advantages are good connections with its surroundings, many activities for the promotion of study programmes, dissemination activities, excellent publishing, systematic involvement of students in professional and research work, solid cooperation with the economy in the region, and an extremely high employability of graduates. The Department has designed a number of systematic activities with the aim of improving the scientific and pedagogical performance of employees, identifying and solving problems in a timely manner, and constantly supplementing and developing its study programmes.

The Panel also noted certain difficulties that were largely caused by a relatively big teaching load. Namely, in addition to the programmes conducted by the Department, teachers and associates teach a number of courses at other University constituents, which is why the teaching load of the majority of staff is close to the upper limit. Unfortunately, the Department is faced with limitations in obtaining new coefficients and hiring additional teaching staff, which then makes it difficult to solve other problems. This primarily refers to the mobility of teaching staff, which is crucial for scientific progress and which is currently at a level that does not allow for major strides in this area. Related to this is the lack of applications for competitive projects (which in contrast to the high success of previous applications). The method of obtaining new teaching positions also makes it difficult to raise the criteria for elections to scientific and teaching grades. This constitutes a number of problems that the Department must face if it is to achieve sustainable development, and progress from the regional to the national level.

The Panel would like to emphasize that it is quite clear that, in all major parameters (scientific activity, number of teachers and students, number of basic and development projects and projects with the economy, incoming and outgoing student mobility, etc.), the Department is still growing and progressing, which is why it is reasonable to expect that main shortcomings will be eliminated in time for the next reaccreditation, and that the Department will show even better results in all areas in which it operates.